WIN! LANCASTER SIMULATOR EXPERIENCE WORTH £495

Closing date 5 June 2025

AEROPLANE

HISTORY IN THE AIR SINCE 1911

April 2025
Issue No 624,
Vol 53, No 4

RED ALERT

The Lightning's ultimate firepower

FLT.LT ROBEES

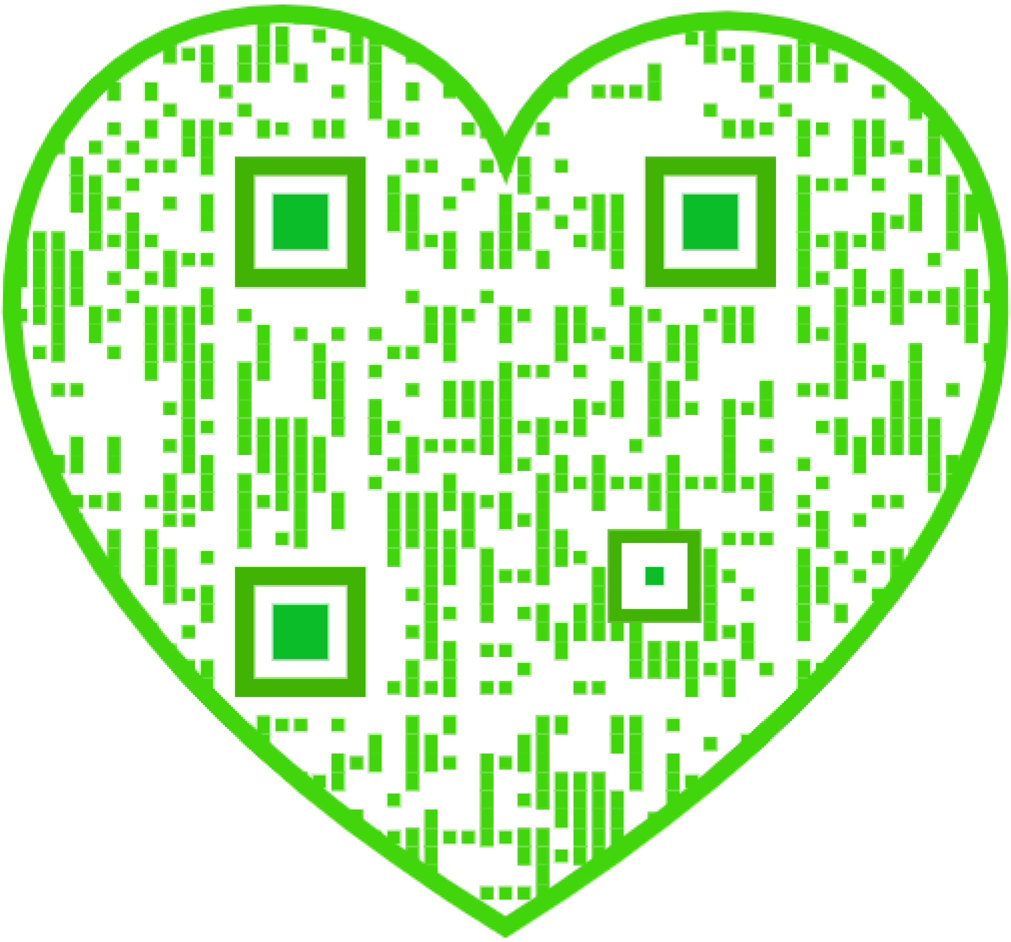
APRIL 2025 £5.99
ISSN 0143-7240
04
9 770143 724187

POST-WAR RAF SALUTE

Featuring a Comet flight and a drunk Soviet leader, the last Beverley and more

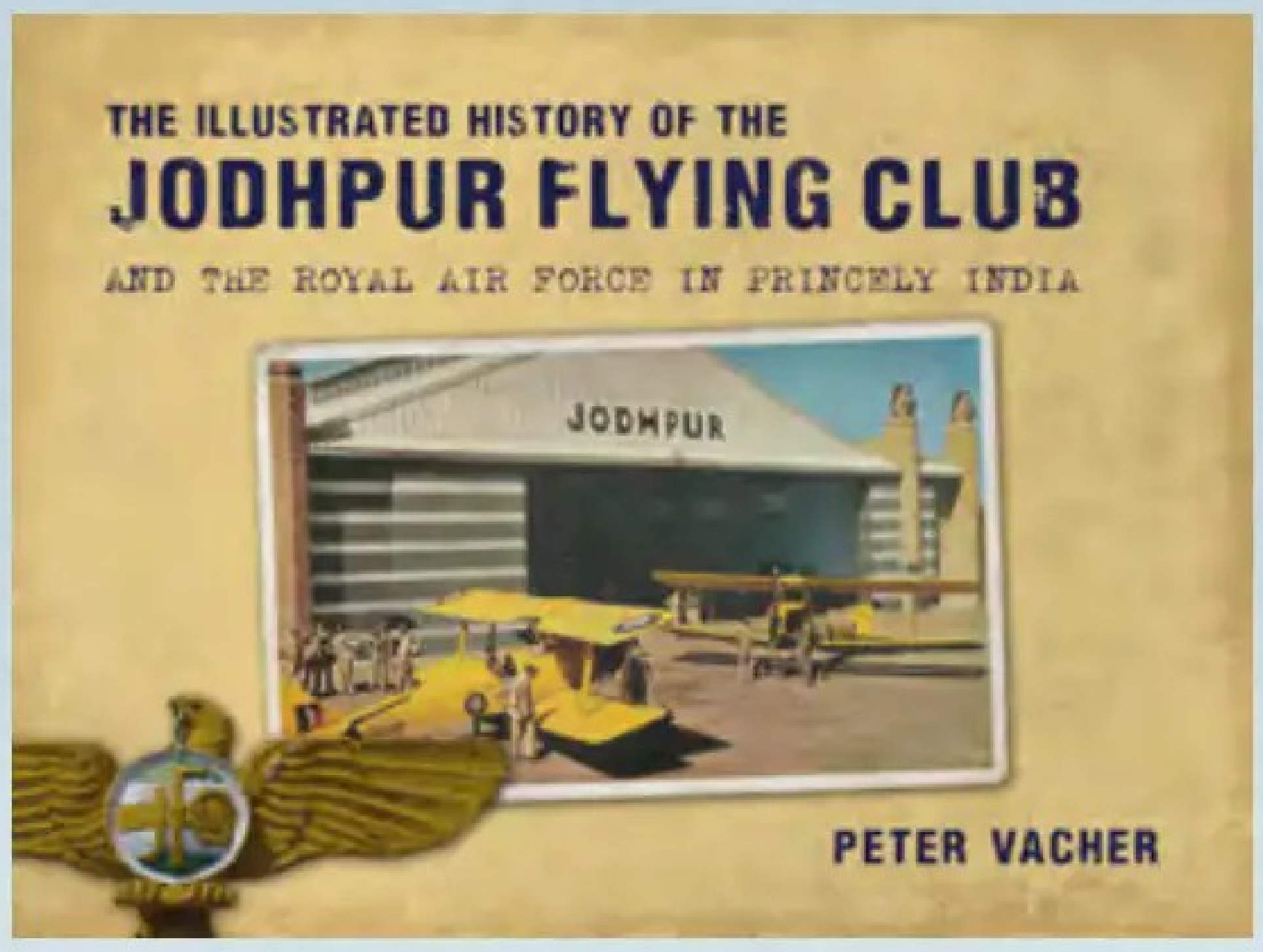
MARS FAREWELL: HUGE FLYING BOAT'S FINAL VOYAGE

MOON LANDINGS: "I FLEW THE FILM TO NEW ZEALAND"

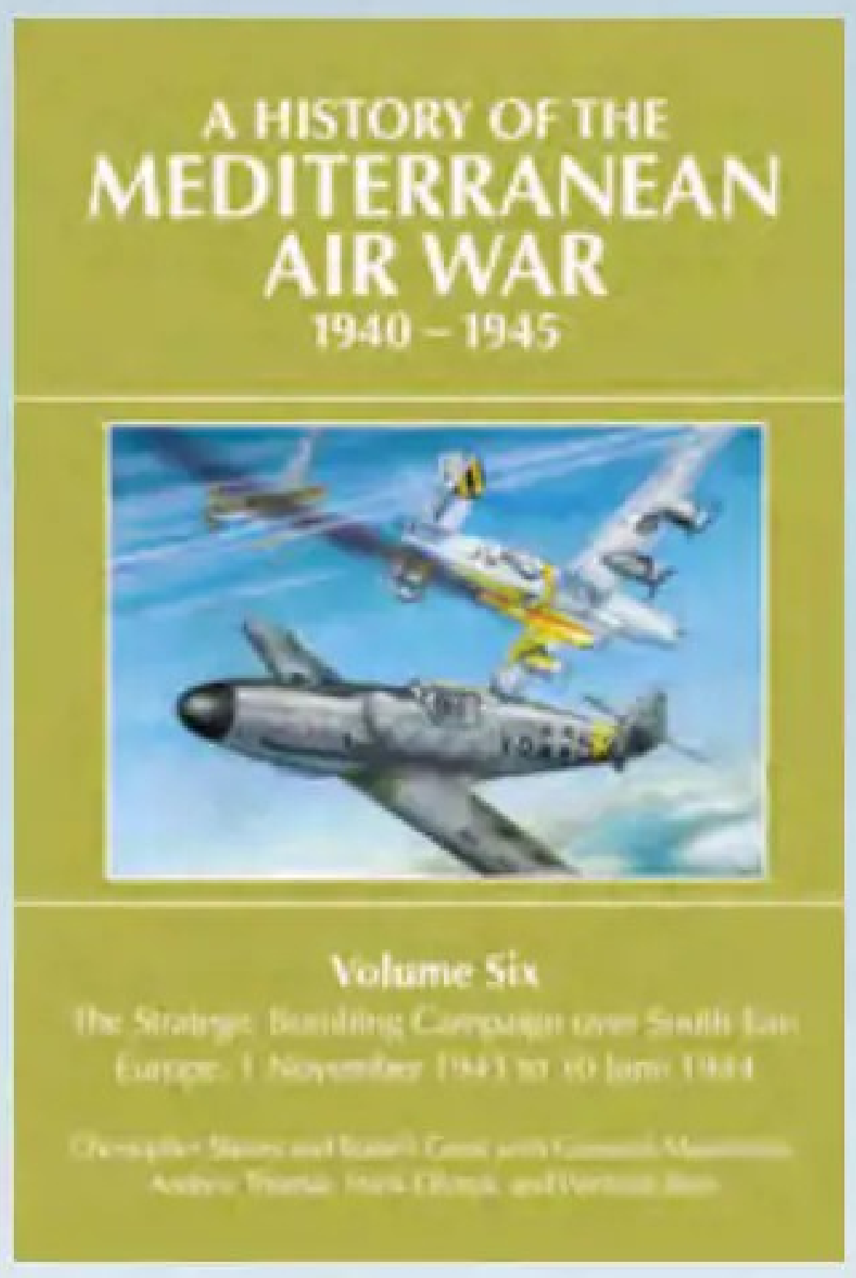


GREAT GRUB STREET BOOKS FOR 2025

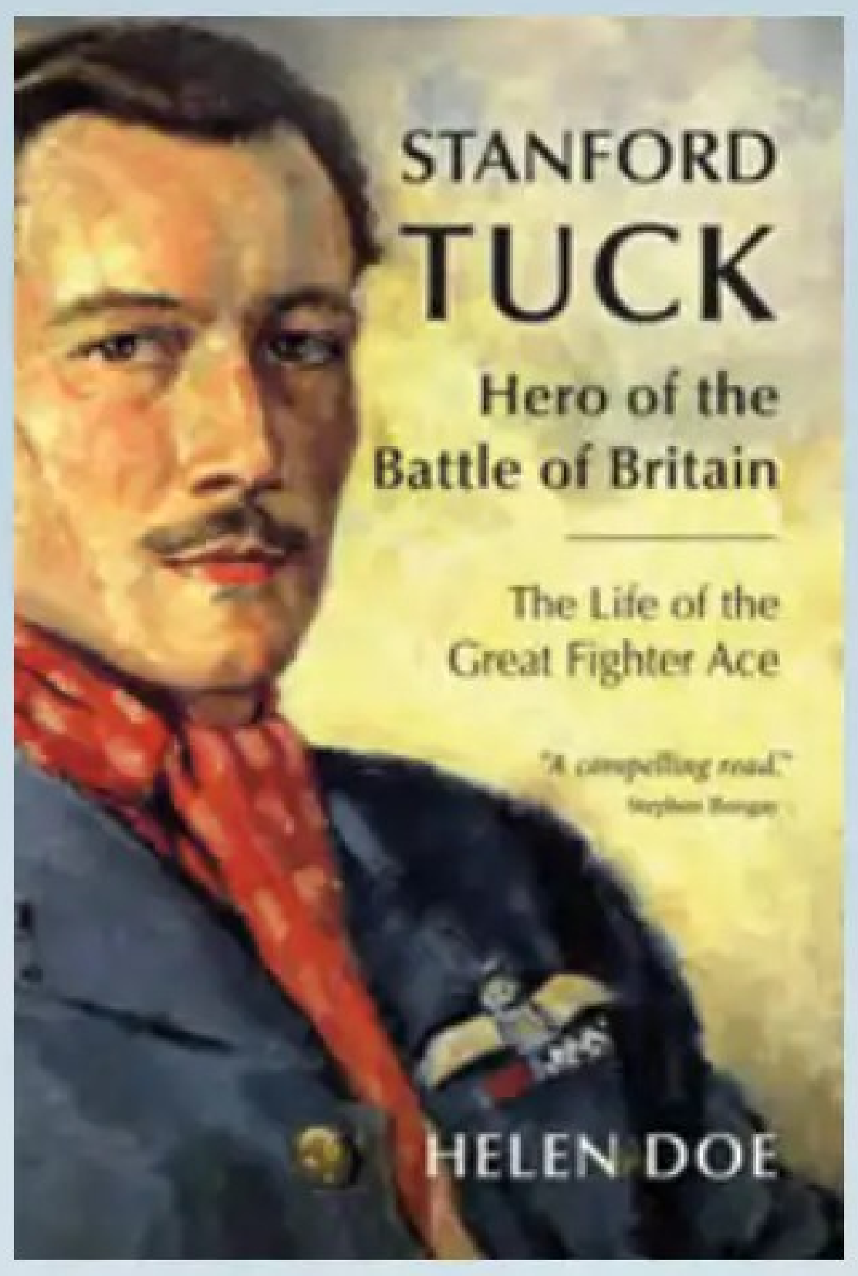
ORDER NOW TO AVOID DISAPPOINTMENT


THE ILLUSTRATED HISTORY OF THE
JODHPUR FLYING CLUB
AND THE ROYAL AIR FORCE IN PRINCELY INDIA
JODHPUR
PETER VACHER

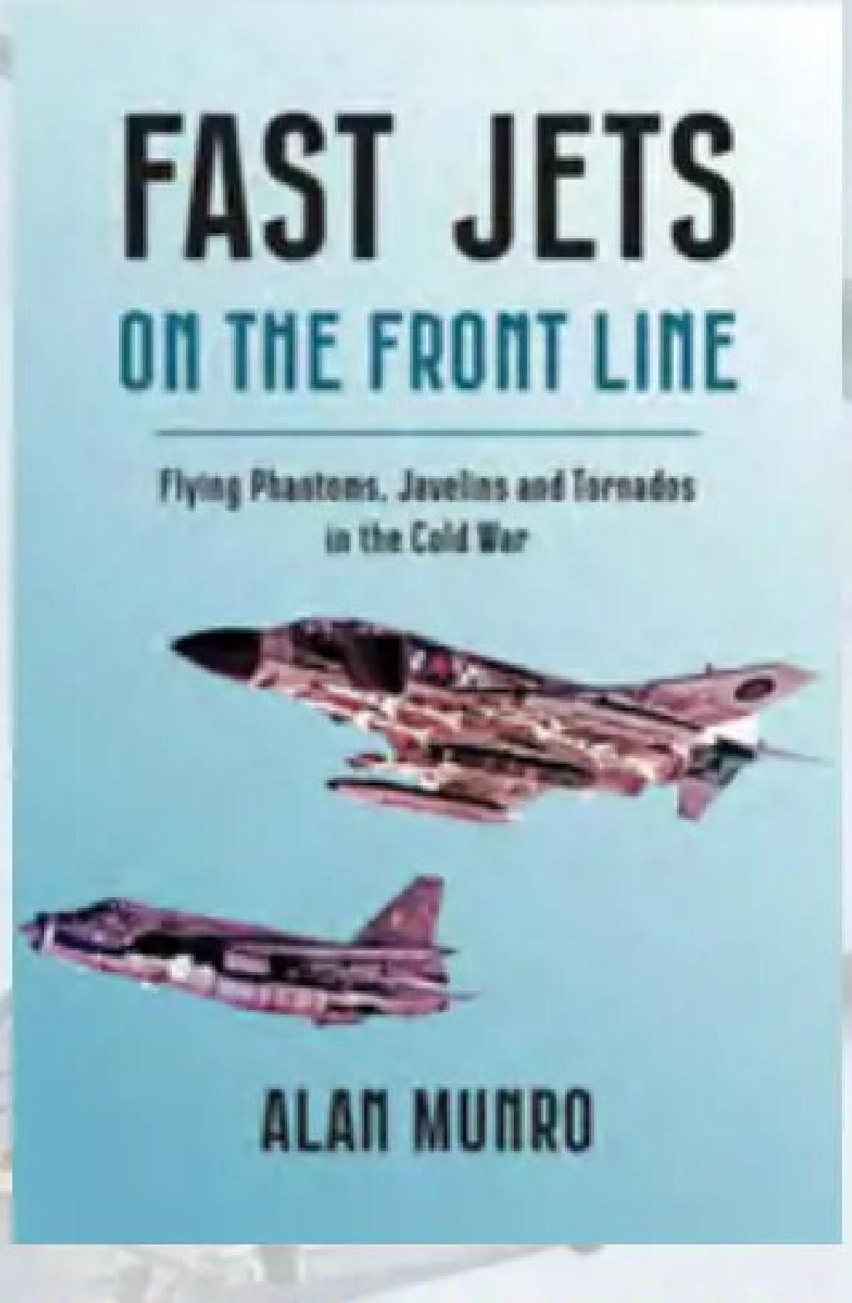
THE ILLUSTRATED HISTORY OF THE JODHPUR FLYING CLUB
Peter Vacher
9781911714224 | HB | £25.00


A HISTORY OF THE
MEDITERRANEAN
AIR WAR
1940 – 1945
Volume Six

A HISTORY OF THE MEDITERRANEAN AIR WAR VOLUME SIX
C. Shores, R. Grant and G. Massimello
9781911714231 | HB | £50.00


STANFORD
TUCK
Hero of the
Battle of Britain
The Life of the
Great Fighter Ace
HELEN DOE

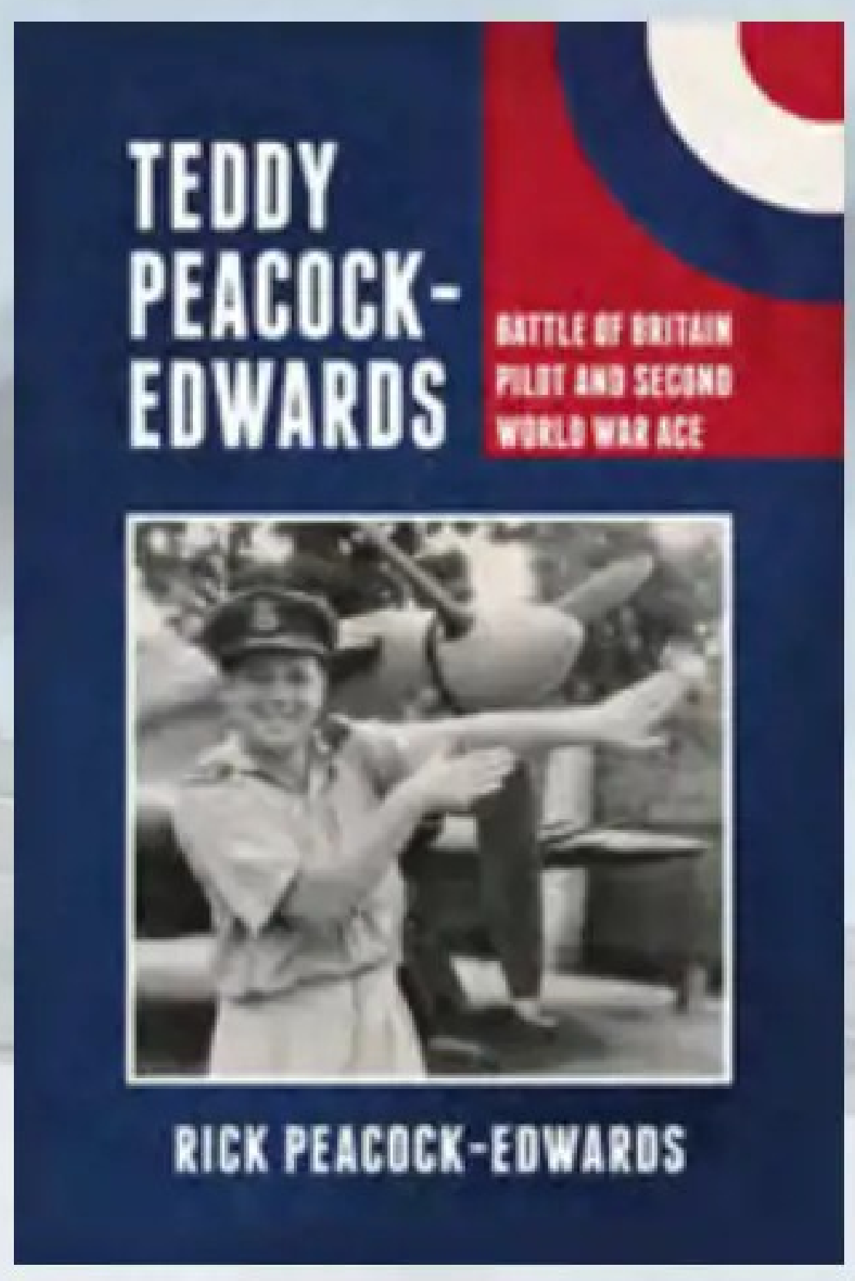
STANFORD TUCK
Helen Doe
9781911714255 | PB | £14.99


FAST JETS
ON THE FRONT LINE
Flying Phantoms, Javelins and Tornados
in the Cold War
ALAN MUNRO

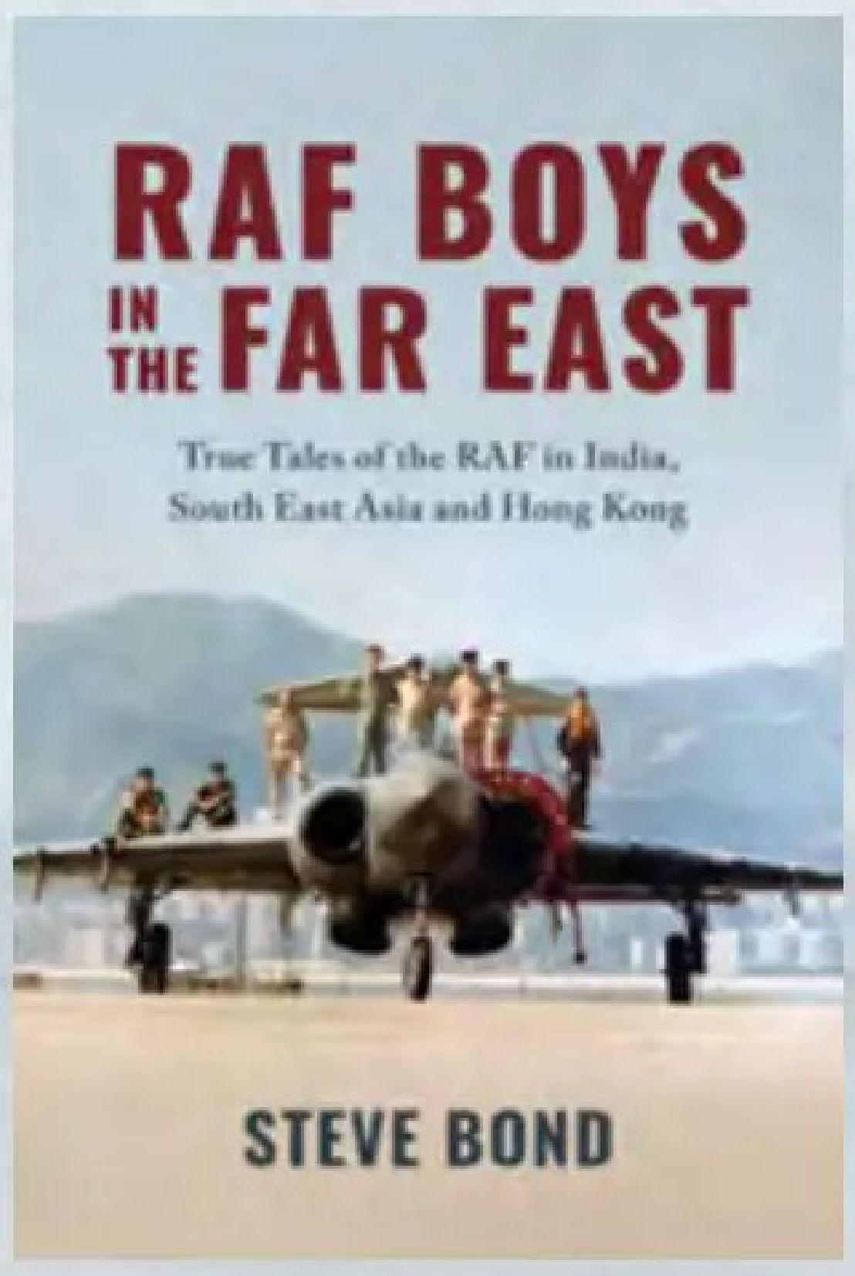
FAST JETS ON THE FRONT LINE
Alan Munro
9781911714248 | HB | £25.00

THE SHY
ASSASSIN
AIR MARSHAL
G. A. 'BLACK' ROBERTSON

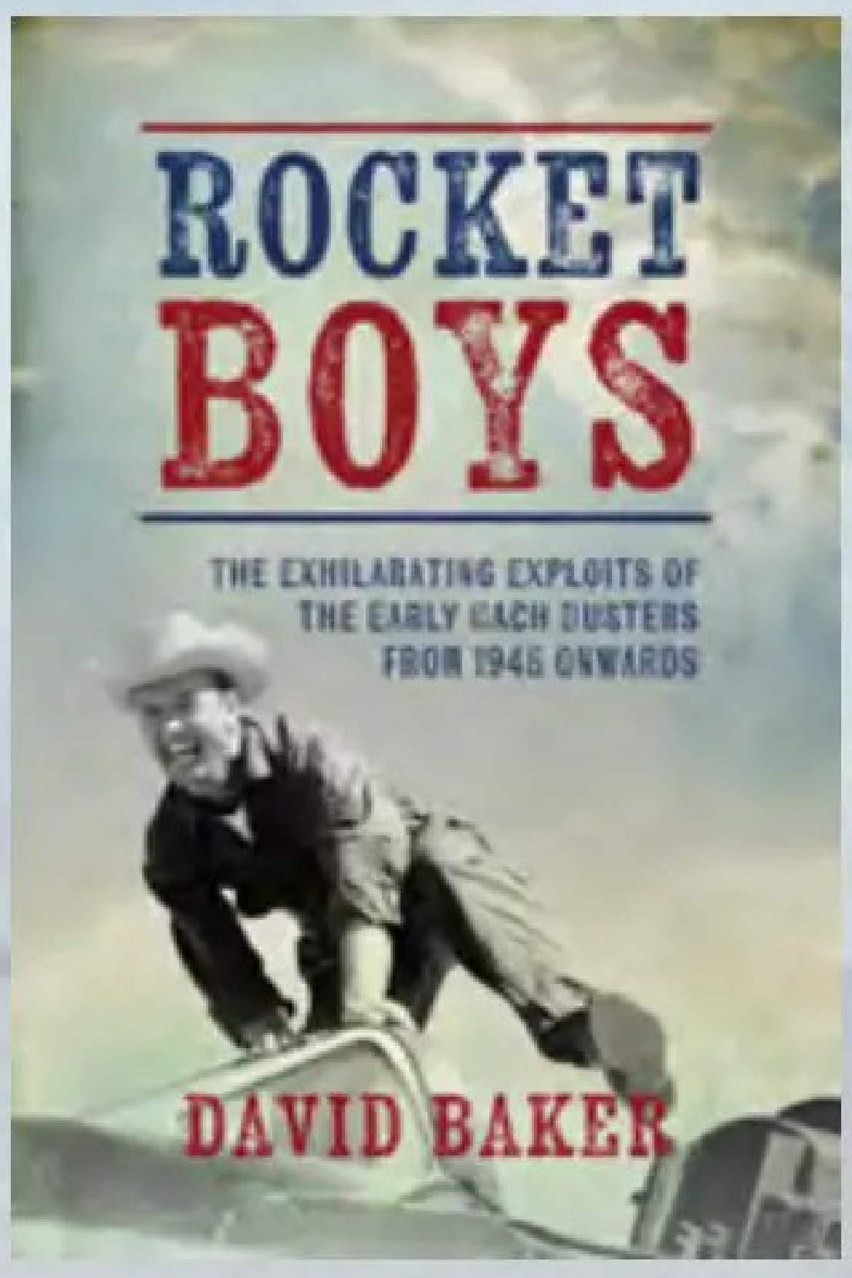
THE SHY ASSASSIN
Air Marshal G. A. 'Black' Robertson
9781911714262 | HB | £25.00


TEDDY
PEACOCK-
EDWARDS
BATTLE OF BRITAIN
PILOT AND SECOND
WORLD WAR ACE
RICK PEACOCK-EDWARDS

TEDDY PEACOCK-EDWARDS
Rick Peacock-Edwards
9781911714279 | HB | £25.00


RAF BOYS
IN THE FAR EAST
True Tales of the RAF in India,
South East Asia and Hong Kong
STEVE BOND

RAF BOYS IN THE FAR EAST
Steve Bond
9781911714286 | HB | £25.00


ROCKET
BOYS
THE EXHILARATING EXPLOITS OF
THE EARLY MACH BUSTERS
FROM 1946 ONWARDS
DAVID BAKER

ROCKET BOYS
David Baker
9781911714095 | HB | £25.00

FOR MORE INFORMATION ON THESE TITLES VISIT OUR WEBSITE
www.grubstreet.co.uk

AVAILABLE TO PURCHASE FROM ALL BOOKSHOPS AND ONLINE

Grub Street Publishing Ltd.
4 Rainham Close, London SW11 6SS
Tel: 0207 924 3966
Email: post@grubstreet.co.uk

SIGNED COPIES AVAILABLE DIRECT FROM GRUB STREET

April 2025

Contents

AEROPLANE
See pages 30-31 for a great subscription offer

NEWS AND COMMENT

4 FROM THE EDITOR

6 NEWS
- Martin Mars makes final journey
- Czech Hurricane flies
- Expansion for Aerospace Bristol?

...and the month's other top aircraft preservation news

14 WORKSHOP
How the Solway Aviation Museum is bringing the last surviving Blackburn Beverley back together

20 HANGAR TALK
Steve Slater's comment on the vintage aeroplane scene

22 FLIGHT LINE
Reflections on aviation history with Denis J. Calvert

24 FROM THE COCKPIT
Join Richard Crockett on his journey as a Shuttleworth pilot

REGULARS

26 SKYWRITERS

28 Q&A
Your questions asked and answered

90 PERSONAL ALBUM
On the Great War front line with New Zealand ace 'Grid' Caldwell

111 REVIEWS
The latest books for the discerning enthusiast

114 NEXT MONTH

FEATURES

POST-WAR RAF

Classic types and great stories from a memorable era

32 LIGHTNING AND RED TOP
The missile that gave the English Electric fighter its greatest punch — and what it was like to use

44 FLYING THE ARGOSY
Hauling cargo, moving VIPs, calibrating navigational aids: an airlifter of many talents

52 JAVELIN OCU
Learning to fly and operate Gloster's big delta-winged jet

58 COMET TO MOSCOW
When one of the RAF's first Comet transports flew to the Soviet capital, it led to a visit full of fascination — described here in more depth than ever before

66 HURRICANE HERITAGE
Making a dedicated operation out of the legendary Hawker warbird

74 LUFTHANSA IN 1955
In the post-war rebirth of the German flag-carrier, both Britain and America had vital roles to play

82 *AEROPLANE* MEETS... GAVIN TRETHEWEY
A New Zealand historic aviation stalwart who's made the most of a decades-long flying career

93 DATABASE: NAKAJIMA B6N TENZAN
Pacific War experience informed the design of this new Japanese torpedo bomber — but, as Tony Holmes outlines, it couldn't change the ultimate course of the campaign

DATABASE
NAKAJIMA B6N TENZAN

16 IN-DEPTH PAGES

KEY.AERO
Your Aviation Destination
AEROPLANE
SUBSCRIBER EXCLUSIVE
See Key.Aero for details

COVER IMAGE: A No 11 Squadron Lightning F6 armed with the Red Top missile. IAN BLACK

WIN! LANCASTER SIMULATOR EXPERIENCE WORTH £495 *See page 57*

From the Editor

CONNECT WITH *AEROPLANE*...
www.facebook.com/AeroplaneMonthly
@HistoryInTheAir

There can be little doubt that we stand on the threshold of a radically different European security order. Across the continent, the need to increase defence spending in the face of what one might euphemistically, politely, call "revised priorities" on the part of the US is hitting home. And this will not, it is clear, be achieved to the necessary degree merely through savings elsewhere.

Nor, I would argue, can it be done without governments taking the public with them. This is where genuine public engagement with the military comes in. In the UK, it seems as if a story about the future of the Red Arrows makes the press every few weeks. How long can the team's ageing Hawk T1s, now the sole examples of the mark in the RAF inventory, be sustained? Can they be justified in cost terms? The Battle of Britain Memorial Flight, too, has been the subject of a good deal of idle speculation. It may be tempting to view both, and other air display activity, as secondary to the air force's primary purposes — as 'luxuries' in what is now a much slimmed-down service when resources are tight. It is my firm opinion that nothing is further from the truth.

I'm reminded of something John Romain said in our '*Aeroplane* meets...' interview last month, relating to a role played by the availability of passenger flights in warbirds. Making this possible, he commented, gave such aeroplanes "accessibility to the general public", who "then would see them in a different light, so we would get better adherence from people for what we were doing". Exactly the same arguments can be applied to the RAF's appearances at air displays. Those teams provide the most prominent public face of the RAF. And as a greater proportion of tax revenue goes towards defence — leaving aside bigger questions of whether it may be necessary to implement tax rises to that end — there is, in turn, a need to make that public face even more visible. During the Cold War, such visibility was vital, and it is again. No 'fly-on-the-wall' TV series, no matter how well-made, nor any quantity of social media campaigns can ever hope to replace the likes of the Red Arrows or solo fast jet displays as a means of making that connection. And with that comes a need to recall the past, and the lessons that can be drawn from it — which is where the BBMF comes in.

> ***"As more money goes towards defence, there's a need for visibility"***

These activities are not just 'nice to have'. They should be viewed as central to our efforts to redouble our defence commitments.

Ben Dunnell

AEROPLANE
ESTABLISHED 1911

Aeroplane traces its lineage back to the weekly *The Aeroplane*, founded by C. G. Grey in 1911 and published until 1968. It was relaunched as a monthly in 1973 by Richard T. Riding, editor for 25 years until 1998.

CONTRIBUTORS THIS MONTH

IAN BLACK

A lifelong aviation enthusiast, Ian has close to 30,000 hours' flying experience. The son of one of the RAF's first Lightning pilots, Ian paradoxically was among the last operational RAF pilots to qualify on the Lightning, in 1987. Subsequently he flew the Tornado F3, Mirage 2000 and Phantom. During his time as an airline captain on the Airbus A330/340 and Boeing 787, Ian became part of the small group who flew the Lightning with Thunder City in Cape Town.

CHRIS GIBSON

For more than three decades Chris has researched and written about Britain's guided weapons and the post-war aircraft that carried them. These weapons have always been at the cutting edge of technology, although the results of these efforts were unrealised, superseded by new threats or overtaken by changes in government policy. Chris has gathered extensive material on the UK's operational requirements and specifications that reflect these changing times and led to operational weapons such as Red Top.

RICK HARLAND

Rick gained his PPL aged 17 via an Air Training Corps scholarship and joined the RAF five years later. He first flew operationally on the Argosy and then the Hercules, which he flew for nearly half of his 25-plus-year career, interspersed with two qualified flying instructor tours on University Air Squadrons and two headquarters tours. After leaving the air force, he obtained his ATPL and civil flight instructor's rating, instructing at the Oxford Aviation Academy. In retirement, he volunteers at the de Havilland Aircraft Museum.

TONY HOLMES

Tony's interest in Japanese combat aircraft of World War Two has developed after editing — and writing — a number of titles featuring such types for Osprey Publishing. Having previously covered the Kawanishi N1K1/2 Shiden and Mitsubishi J2M Raiden in the Database series, he turns his attention to the Nakajima B6N Tenzan. The ultimate Japanese torpedo bomber, it achieved moderate success both in its designed role and as a platform for kamikaze attacks.

what. three. times?

GMT
AUTOMATIC
300m|1000ft
SWISS MADE

By combining the Trident GMT 300's bi-directional, 24 hour bezel and fourth hand, you can read three different time zones. At a glance. That's assuming your eyes aren't fixated on its beautifully chamfered hour indexes. Or (at night) the Grade X1 GL C1 Super-LumiNova®, with which they're filled. Even the reverse of its 300m water-resistant, Lightcatcher™ case captivates. Viewed through a second sapphire crystal, Sellita's SW300-2 movement provides 56 hours power reserve. Enough time to pack it away. Then travel to three separate time zones, across both hemispheres. And back again, without it needing a wind. Why you'd ever want to take it off? That we can't explain.

Do your research

Christopher
Ward

Book a
showroom
appointment

christopherward.com

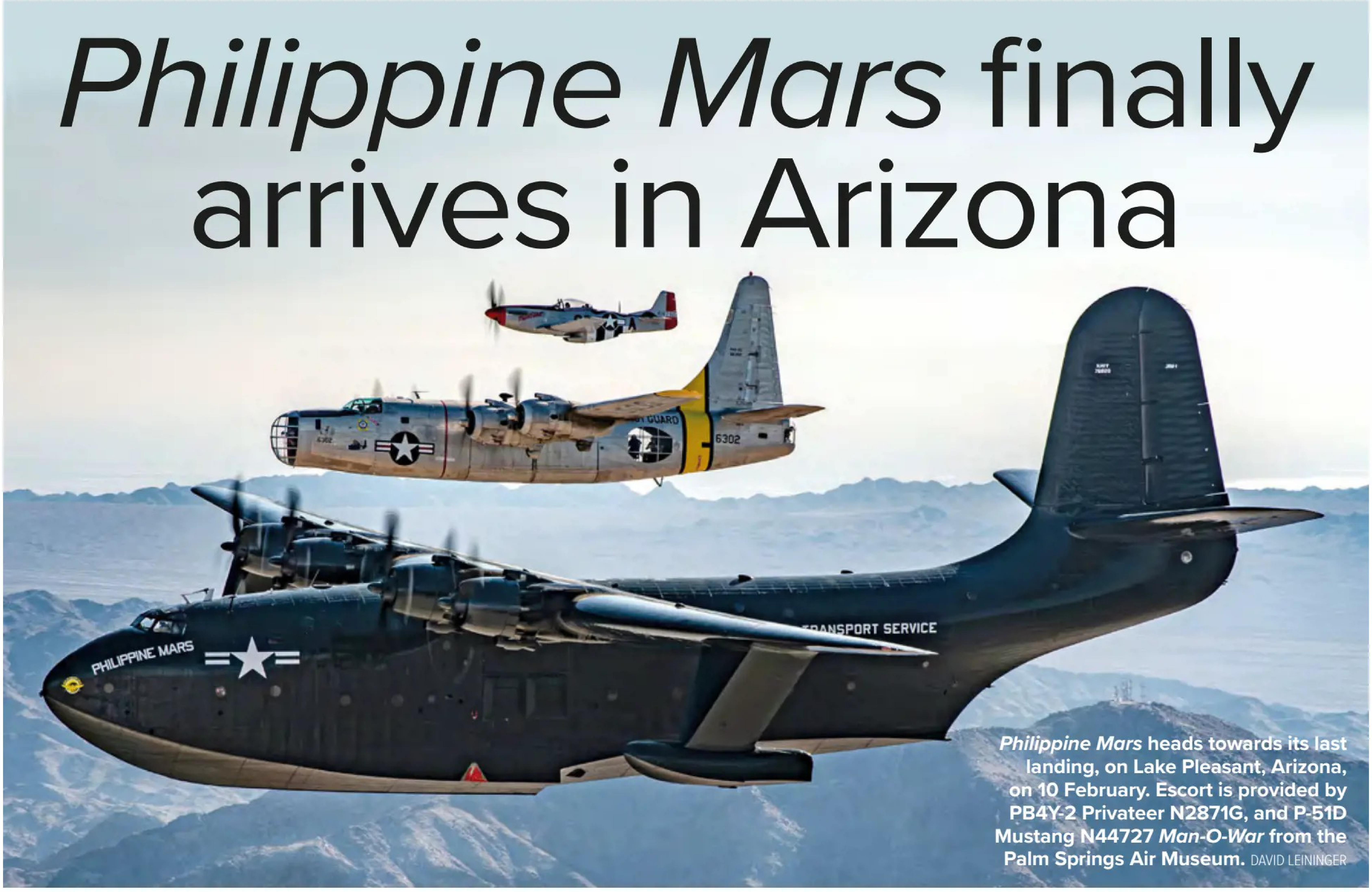
View the
watch

News

NEWS EDITOR: TONY HARMSWORTH

E-MAIL TO: tony.harmsworth@keypublishing.com
TELEPHONE: +44 (0)7791 808044
WRITE TO: *Aeroplane*, Key Publishing Ltd,
PO Box 100, Stamford, Lincolnshire PE9 1XQ, UK

Philippine Mars finally arrives in Arizona



Philippine Mars **heads towards its last landing, on Lake Pleasant, Arizona, on 10 February. Escort is provided by PB4Y-2 Privateer N2871G, and P-51D Mustang N44727** ***Man-O-War*** **from the Palm Springs Air Museum.** DAVID LEININGER

The last flight of a Second World War-era flying boat was completed on 10 February when Martin JRM-1 Mars C-FLYK *Philippine Mars* landed on Lake Pleasant, Arizona, 166 miles north of the Pima Air and Space Museum, its final home. Dismantling for the road trip to Pima soon began, the four Wright R-3350 engines being the first parts to arrive by truck, on 21 February.

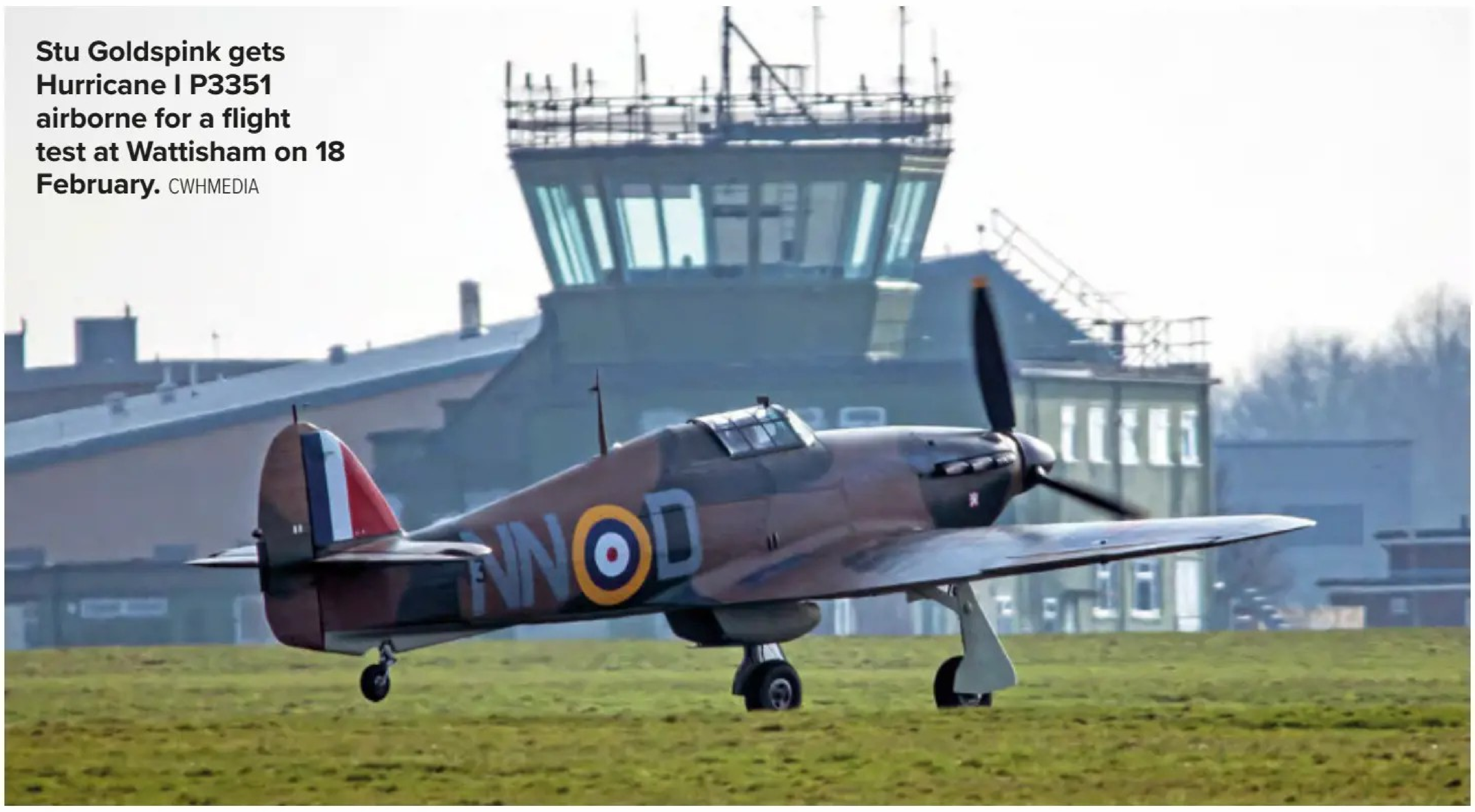
The Wright R-3350 engines arrive at the Pima Air and Space Museum on 21 February. PASM

Acquired by the museum from fire-bomber operators Coulson Aviation in April 2024, the ferry flight of *Philippine Mars* from its base at Port Alberni, Sproat Lake, British Columbia had been interrupted several times by engine problems. The machine had made its first flight for 17 years on 3 December 2024, but a cracked crankcase on the left inboard engine saw a replacement being sourced from sister-ship C-FLYL *Hawaii Mars*, which had been ferried from Sproat Lake to its final home at the British Columbia Air Museum on 11 August 2024. Further powerplant problems were encountered on 11, 15 and 22 December, and after a total of four engine changes *Philippine Mars* finally left Sproat Lake for the final time at 11.09hrs Pacific Standard Time on 9 February, landing in San Francisco Bay nearly five hours later before spending the night moored at the Alameda Seaplane Base.

The following morning the crew for the last Mars flight, Peter Killin, Todd Davis, Mike Johnson, Dave Millman, Mario Di Rocco and Alexander Mackenzie, took *Philippine Mars* into the air one more time. It was joined near Palm Springs, California, by another former fire-bomber, the world's sole airworthy Consolidated PB4Y-2 Privateer, N2871G, and a P-51D Mustang, N44727, which escorted the Mars to Lake Pleasant and the final landing.

The flight from San Francisco to Lake Pleasant had added 4.2 hours to the logbook of JRM-1 BuNo 76820 *Philippine Mars*, which had originally opened nearly 79 years earlier, way back in June 1946.

CZECH HURRICANE FLIES IN SUFFOLK


Stu Goldspink gets Hurricane I P3351 airborne for a flight test at Wattisham on 18 February. CWHMEDIA

The Letecké Muzeum Točná-owned Hawker Hurricane I P3351 flew again on 17 February from Elmsett, Suffolk with Stu Goldspink — the highest-time Hurricane pilot in the world — at the controls. This followed restoration and painting in the markings of a No 310 Squadron Hurricane, P3143, which was flown by several Czechoslovak pilots during the Battle of Britain.

Having landed at Wattisham at the end of the first flight, further test flights were undertaken from the Army Air Corps station over the next few days, prior to the aircraft being signed off. It will then be flown via the organisation's maintenance location in Belgium to Točná airfield just south of Prague, where it will join, among others, several aeroplanes that are the only airworthy examples of their type in Europe, including Lockheed 10A OK-CTB, Praga E-114M Air Baby HB-UAF, and two replicas of 1920s Czech designs, an Avia BH-1 and BH-5.

Originally built as a Hurricane I, P3351 flew with No 73 Squadron during the Battle of France. It was subsequently modified to Hurricane IIa configuration and re-serialled as DR393, being flown by the Soviet Air Force until it crashed near Murmansk after suffering damage to its radiator, possibly by German ground fire.

The wreckage was recovered during 1991, and upon acquisition by New Zealand warbird collector Sir Tim Wallis for his Alpine Fighter Collection was restored in Suffolk by Hawker Restorations, a company originally set up by Sir Tim and British engineer/pilot/racing driver Tony Ditheridge. Shipped to New Zealand, it flew again on 12 January 2000 from Christchurch Airport with Keith Skilling at the controls, once more resplendent in its No 73 Squadron Battle of France markings. In January 2013 the Hurricane was acquired by Cannes, France-based Jan Roozen, and it took to the air at Dijon-Darois on 14 May of that year, registered F-AZXR. It was then seen at many events in Europe until being put up for sale in the summer of 2022. The French registration was cancelled on 11 August 2022 and it returned to the UK for conversion to two-seat configuration, but that did not go ahead after the fighter was speedily purchased by the Letecké Muzeum Točná.

Work has included the rebuild of the Rolls-Royce Merlin 35 engine by Vintage V-12s in Tehachapi, California and a repaint into No 310 (Czechoslovak) Squadron colours. It has been given the NN-D codes worn by P3143, the first Hurricane delivered to 310 at Duxford during July 1940.

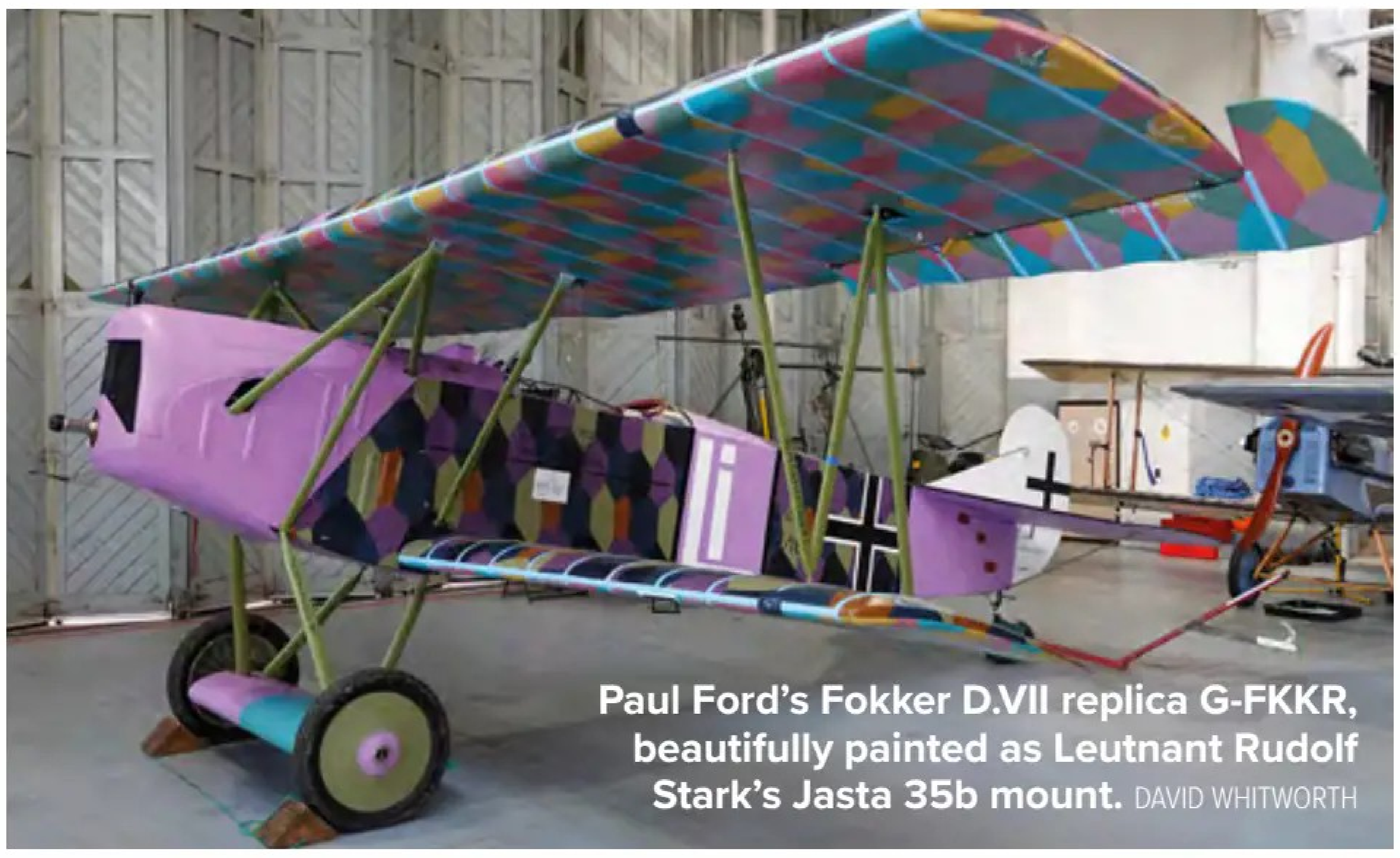
P3143 operated from Duxford between 24 July and 16 October, during which time it shot down six enemy aircraft, with another shared: the first two, a Messerschmitt Bf 110 C and a Dornier Do 17 Z, were brought down on 3 September near North Weald by Flt Lt Gordon Sinclair. Another Bf 110 C and a Bf 109 E were shot down by Sgt Bohumil Fürst over Whitstable and Canterbury respectively on 7 September, P3143 becoming a specialist 'Zerstörer' destroyer when a further Bf 110 C was downed on 9 September south of London with Plt Off Stanislaw Fejfar at the helm. On 15 September Fürst — who flew P3143 more than any other pilot — got a half-share in a Heinkel He 111 H-2 over Essex, and three days later Sgt Eduard Prchal destroyed a Junkers Ju 88 A over Stanford-le-Hope, Essex.

Sgt Jan Chalupa was at the controls of P3143 during the afternoon of 16 October for a training flight when the Rolls-Royce Merlin failed. Chalupa bailed out, but his parachute did not open fully and he fell to his death close to Ely railway station, the Hurricane plunging into the River Great Ouse.

D.VII to Duxford

Paul Ford's Fokker D.VII replica, G-FKKR, was having engine runs at Duxford on 16 February, having arrived at the IWM airfield from Paul's workshop at Egginton, south Derbyshire in late January. The machine is powered by a de Havilland Gipsy Queen 30 inverted straight-six, derated from its usual 240hp to about 200hp, originally fitted to a DH114 Heron.

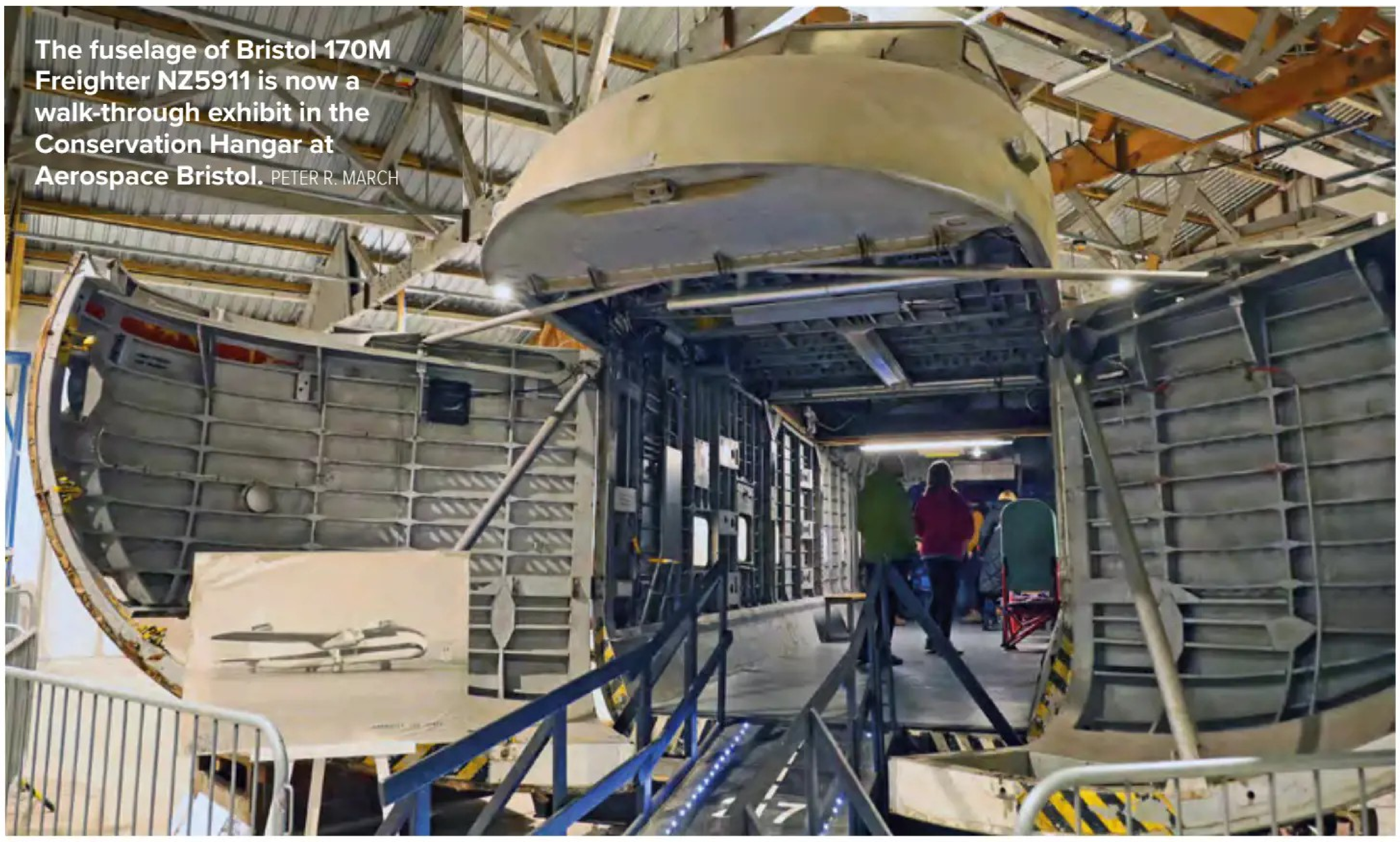
The replica has been painted in the markings of a Jasta 35b D.VII, 4523/18 *Li*, flown by Leutnant Rudolf Stark in late 1918. Iron Cross First Class recipient Stark, who had 11 confirmed and five unconfirmed victories, was one of the longest-lived World War One aces, dying at the age of 85 during 1982.


Paul Ford's Fokker D.VII replica G-FKKR, beautifully painted as Leutnant Rudolf Stark's Jasta 35b mount. DAVID WHITWORTH

Expansion on the cards at Aerospace Bristol?

Plans are said to be being discussed to develop the Aerospace Bristol museum at the old Filton airfield with financial support from Rolls-Royce and Airbus. This could see the relocation of the historic Filton control tower from outside the museum perimeter to the Aerospace Bristol site, the rebuilding of Hangar R and construction of a new exhibition building. It is hoped the RAF Museum's Bristol 188, XF926, now stored at Cosford, will ultimately be moved to Aerospace Bristol and housed in Hangar R, and that the new building will provide a home for former Royal New Zealand Air Force Bristol 170M Freighter NZ5911, ex-Royal Canadian Air Force Bolingbroke RCAF 9048, and a currently unspecified Britannia.

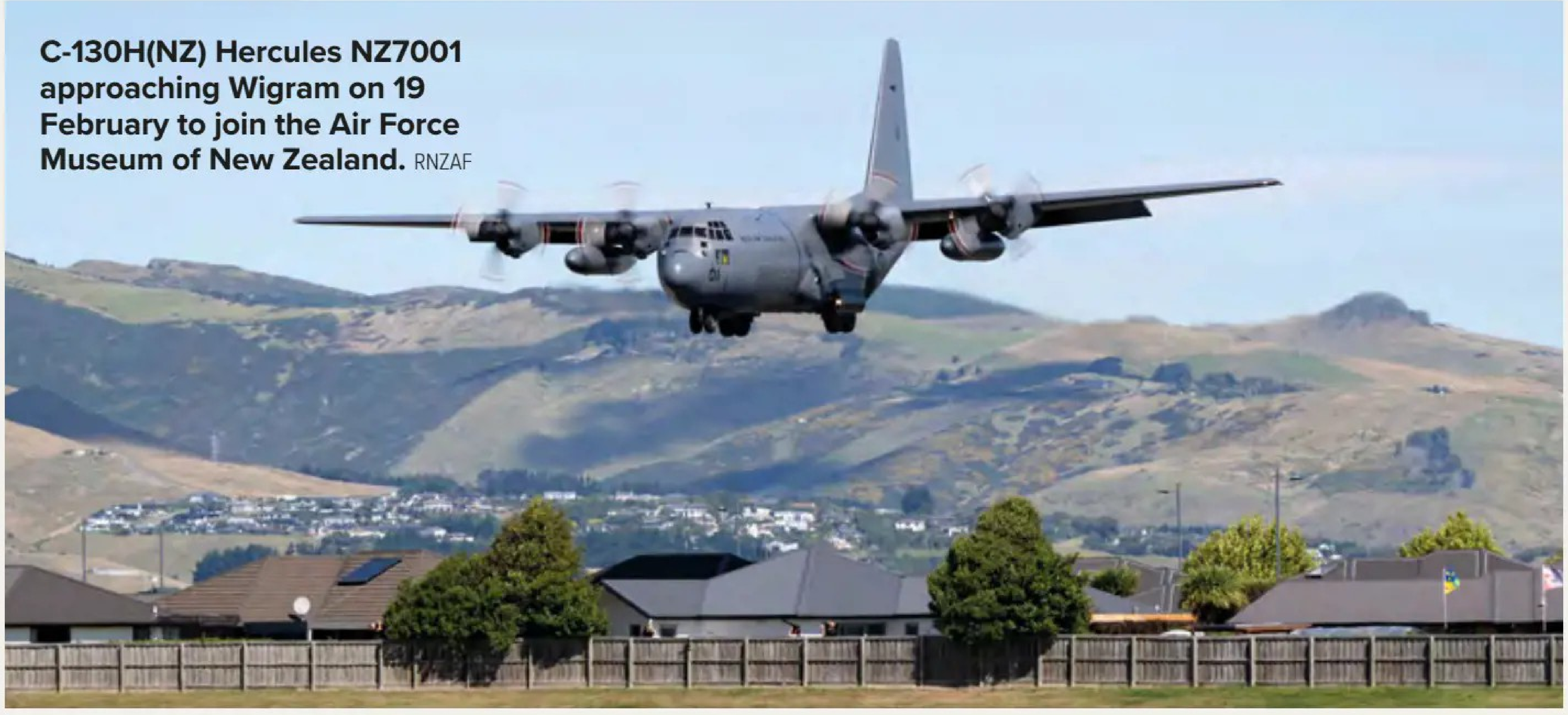
Fifty-odd Bristol, Bristol-Siddeley and Rolls-Royce aero engines that are housed in the Sir Roy Fedden Heritage Centre may also be relocated from their current home just 900 yards away to the Aerospace Bristol site to further enhance the displays. The Freighter — which was brought back from New Zealand in 2017 and is the sole example in the UK — is now open to visitors as a 'walk-through' exhibit in the conservation workshop, close to the Bolingbroke, whose rebuilt tailplane and fin, rudder and elevators were being refitted to the airframe during February.


The fuselage of Bristol 170M Freighter NZ5911 is now a walk-through exhibit in the Conservation Hangar at Aerospace Bristol. PETER R. MARCH

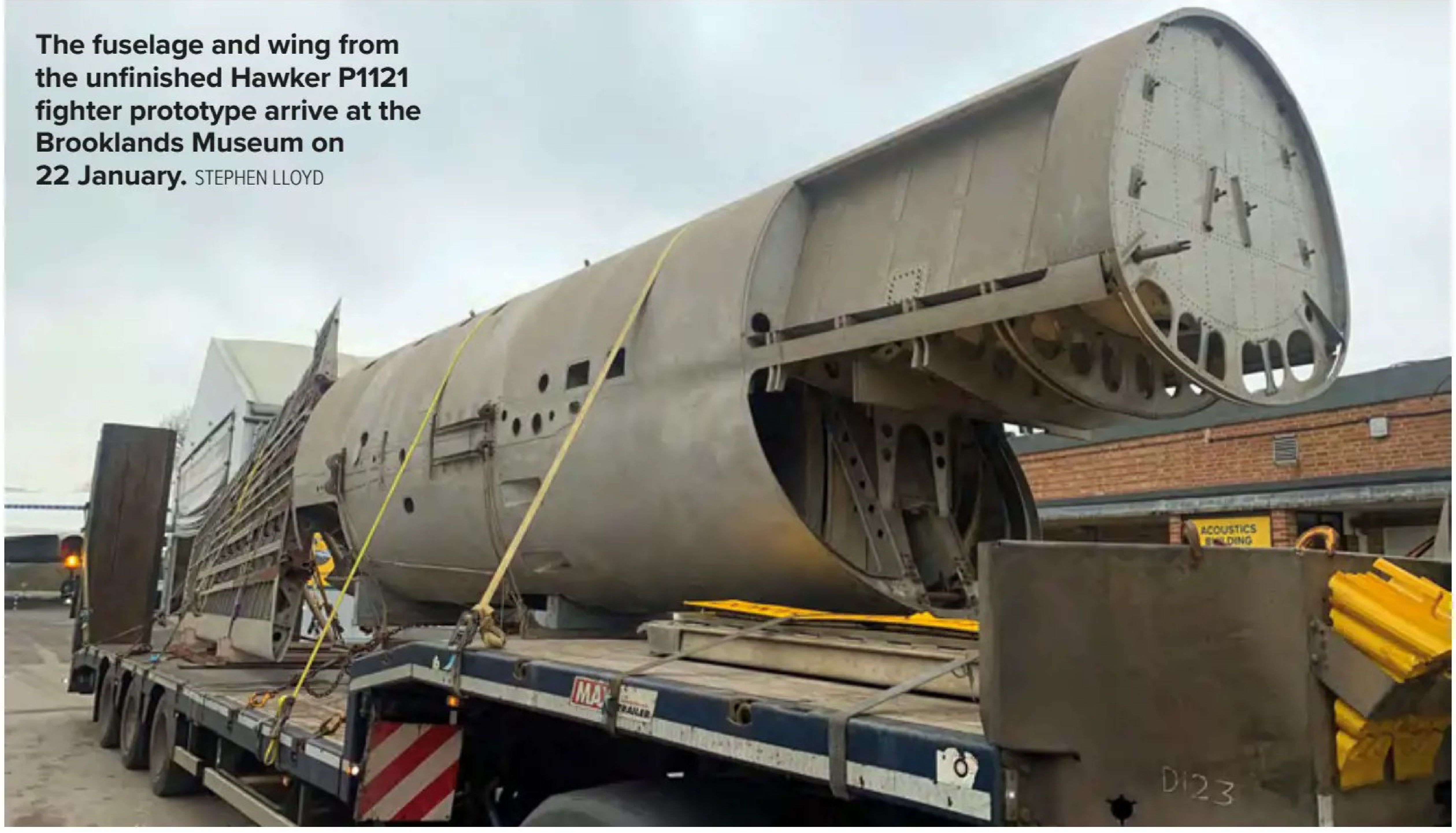
Hercules added to RNZAF collection

Following 60 years' service with the Royal New Zealand Air Force, Lockheed C-130H(NZ) Hercules NZ7001 arrived at the Air Force Museum of New Zealand at Wigram, Christchurch on 19 February. NZ7001 — the very first Hercules to serve in the RNZAF — made the last of more than 20,000 landings on a shortened airstrip outside the museum, a full 30 years after Wigram closed as an operational base.

Now the aircraft is safely retired the museum has launched a campaign to raise the more than $16 million needed to build a new home for the Hercules and its sister type, the Lockheed P-3K2 Orion. Air Force Museum director Brett Marshall says, "The Christchurch City Council has already swung in behind us by earmarking $5 million in its annual plan to support the build. We're looking to the public to help us raise another $11 million to house the aircraft so they can be conserved and displayed for the generations to come."


C-130H(NZ) Hercules NZ7001 approaching Wigram on 19 February to join the Air Force Museum of New Zealand. RNZAF

P1121 ARRIVES AT BROOKLANDS


The fuselage and wing from the unfinished Hawker P1121 fighter prototype arrive at the Brooklands Museum on 22 January. STEPHEN LLOYD

The Brooklands Museum at Weybridge, Surrey took delivery of three sections of the unfinished single-seat, multi-role, Mach 2.5 Hawker P1121 fighter on 22 January. Once ready for display, the P1121 will be presented alongside the Supermarine Swift and Hawker P1127 in the museum's Aircraft Factory building.

The P1121 was conceived in the mid-1950s as part of Hawker Siddeley's response to a series of operational requirements issued by the Air Ministry, and was at one point pitched as a possible Hawker Hunter and English Electric Canberra replacement. Privately funded by Hawker, the programme progressed to the point of significant wind tunnel testing, a full-scale wooden mock-up and the go-ahead for construction of a prototype. However, a total lack of interest from the Air Ministry or export customers — set against the background of Duncan Sandys' infamous 1957 Defence White Paper — led to the decision to halt work in April 1958. By then the cockpit section, fuselage and one wing had been built.

The partially constructed aircraft was given to the College of Aeronautics at Cranfield for use as an instructional airframe before finding its way to the RAF Museum's reserve collection at Cosford. There it remained, held in store, until being put up for disposal in December 2021.

The P1121 was acquired by the Brooklands Museum, which took it into storage off-site in November 2023. With the airframe now at the museum, work will soon begin to prepare it for display. ***Andrew Critchell***

BIG GRANT FOR RAF MUSEUM MIDLANDS

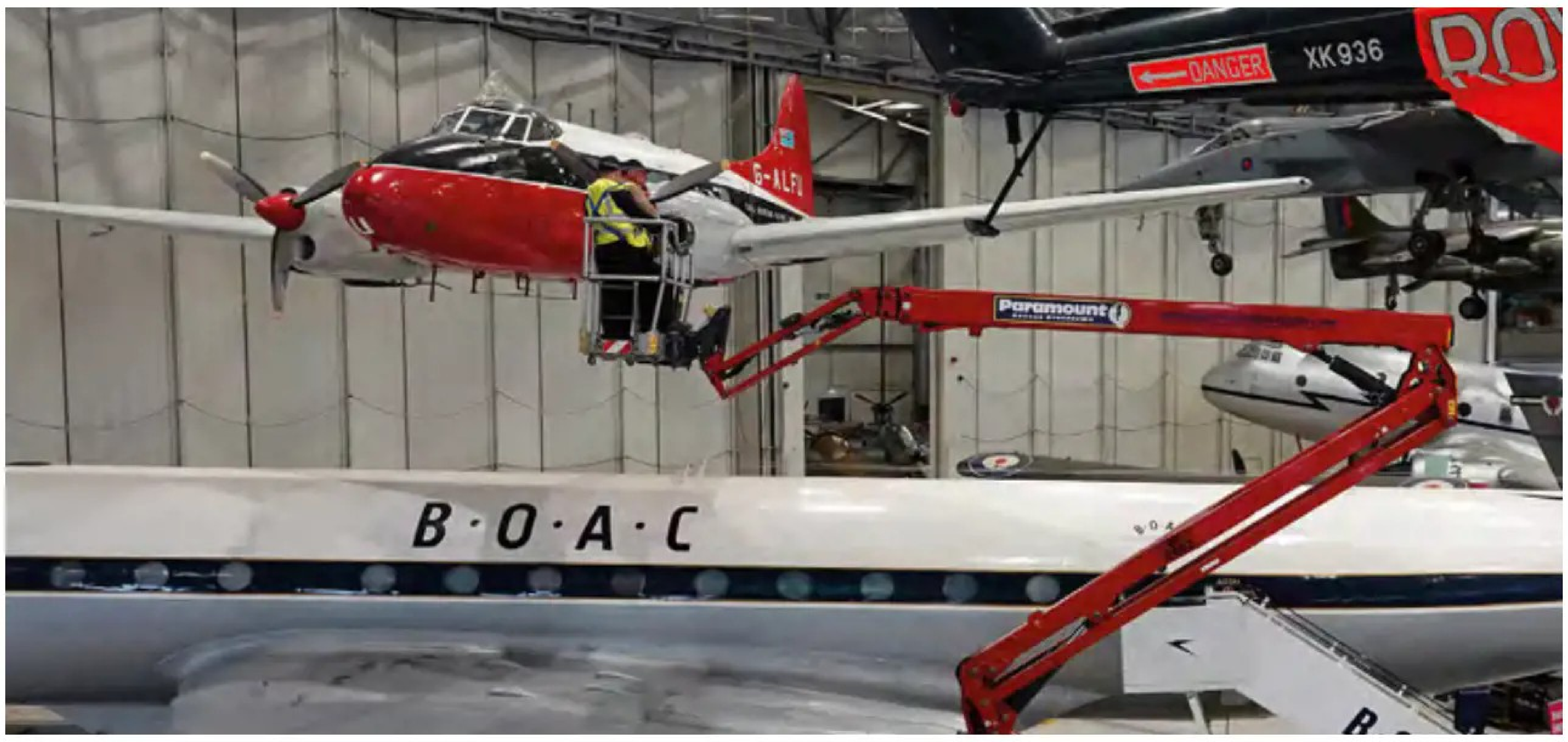
On 4 February the RAF Museum announced it has been awarded a £650,000 grant from the Wolfson Foundation for the Inspiring Everyone: RAF Museum Midlands Development Programme.

The project at RAF Cosford will bring about a major regional engagement effort alongside a site transformation, including a new immersive exhibition that will explore the role of the RAF from 1980 to the present day and into the future. A purpose-built Collections Hub will enable the museum's stored collection — currently at MoD Stafford — to be brought on site and opened to the public for the first time, providing opportunities for research, conservation, activities, talks and tours. Additionally, a new Learning Centre co-designed with students and teachers will provide bespoke facilities for lifelong learning programmes.

The project is supported by a number of backers including the National Lottery Heritage Fund, as well as the RAF Museum's own investment. Work will start later this year and is expected to be complete by the summer of 2027.

A computer-generated image of one of the proposed new displays in the rejuvenated Hangar 1 of RAFM Midlands at Cosford, featuring Chinook HC6A ZA718, the legendary 'Bravo November'. RAFM

Airliners heading outside as Duxford reshuffle starts



Preparations to bring ex-Civil Aviation Flying Unit Dove G-ALFU down from the roof of Duxford's AirSpace hangar were under way during late January. DAVID WHITWORTH

The Duxford Aviation Society confirmed on 13 February that three of the aircraft in its British Airliner Collection — Berlin Airlift veteran Avro York G-ANTK, de Havilland Comet 4 G-APDB, the first jet airliner to undertake a non-stop trans-Atlantic crossing, and de Havilland Dove G-ALFU — will be moved onto display outside as part of the Imperial War Museums' development of the AirSpace building at Duxford into a Cold War and Contemporary Conflict exhibition space.

In a statement, the society said, "As an accredited museum, Duxford Aviation Society is mindful of the requirement to preserve the aircraft in its care and will continue to use all possible means available to safeguard its aircraft. The added challenges of preserving important historical aircraft outside is well understood by DAS over many years at Duxford. Happily DAS has an enviable record at solving these problems, but it is expensive and requires many hours of work. We are planning a fundraising effort to help DAS meet the tasks ahead so that Duxford visitors can continue to enjoy boarding our aircraft for many years to come". Inside AirSpace, work to 'de-suspend' several airframes from the roof, including the Dove, was under way as of late February. Among the exhibits staying in the building in its revamped form will be DAS's Concorde G-AXDN and Handley Page Hermes fuselage G-ALDG. ***Ben Dunnell***

HAVOC DAMAGED IN TEXAS

NIGEL HITCHMAN

The San Antonio-based Lewis Air Legends Douglas A-20G Havoc, 43-21709/N747HS — which was the world's only airworthy example of the type — suffered substantial damage during a forced landing at the Washington's Birthday Celebration Stars and Stripes Airshow at Laredo, Texas on 16 February. Well-known air racing and airshow pilot Stewart Dawson was airlifted to hospital, where he was reported to be in a stable condition with head and face injuries. Initial reports suggest a mechanical issue caused the need to land in a field just north of the airport boundary. After settling in an upright position, a brief post-crash fire caused damage to the nose section. Restored to fly by Aero Trader at Chino, the machine made its maiden post-rebuild flight from the California aerodrome on 15 July 2015.

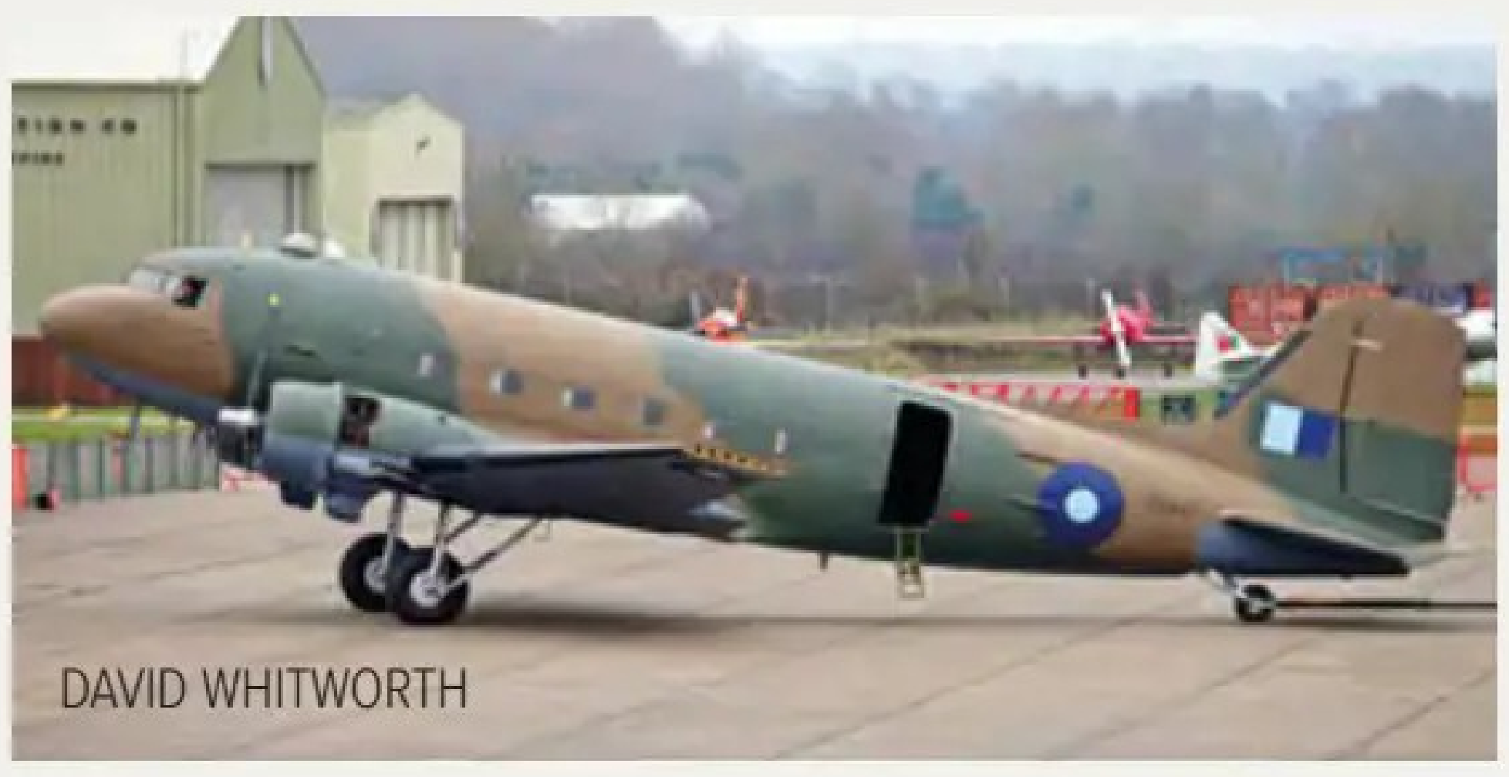
NEWS IN BRIEF

CHRISTIAN AMARA 1939-2025

French historic aircraft collector Christian Amara died on 10 February aged 85. The founder of Melun-based France's Flying Warbirds, which operated such aircraft as P-40N F-AZKU *Little Jeanne* and P-51D F-AZSB *Nooky Booky IV*, Amara was a driving force behind the Air Legend show at Melun. BEN DUNNELL

BBMF 'DAK' REPAINTED

On 13 February, the Battle of Britain Memorial Flight Douglas Dakota III, ZA947, emerged from the Aircraft Restoration Company hangar at Duxford in a new South East Asia Command colour scheme.



DAVID WHITWORTH

FLAMBARDS EXHIBITS FOR AUCTION

The closure of the Flambards theme park — originally founded as the Cornwall Aero Park — in Helston last November has led to its aviation exhibits being put up for auction. The wooden Concorde nose, cockpit and forward fuselage mock-up, built and used for the supersonic airliner's development by BAC at Filton, and the nose of Shackleton T4 WG511 are being sold by Lay's Auctioneers of Penzance on 27 March. BD

DH60 MOTH HITS 100

The first day of the Shuttleworth Collection's Engineering Open Workshop Weekend at Old Warden on 22 February coincided with the 100th anniversary of the first flight of the prototype DH60 Moth. The collection's G-EBLV, the eighth production DH60, is currently in the Old Warden workshops, and should feature in Shuttleworth shows again this year.

GUPPY NOSE SAVED

Conroy CL-44 Guppy 9G-LCA was finally scrapped at Bournemouth during January, but the nose has been saved by the South Wales Aviation Museum and will soon be moved to St Athan. There it will eventually be displayed near the cockpit of Super Guppy F-BTGV, broken up at Bruntingthorpe in December 2020.

GARY SPOORS

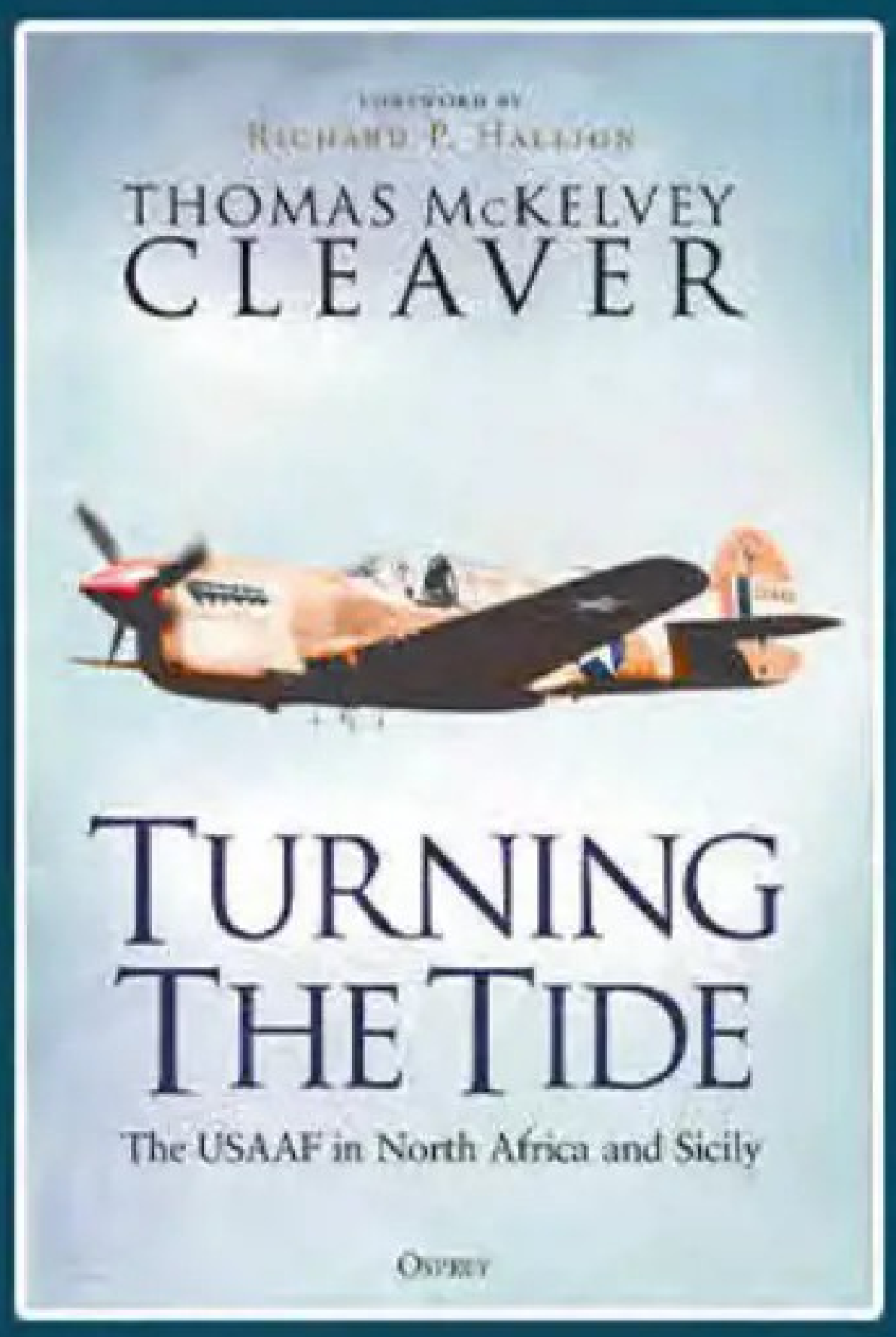
"A bold attempt to raise the consciousness of readers and historians to this epic air campaign."

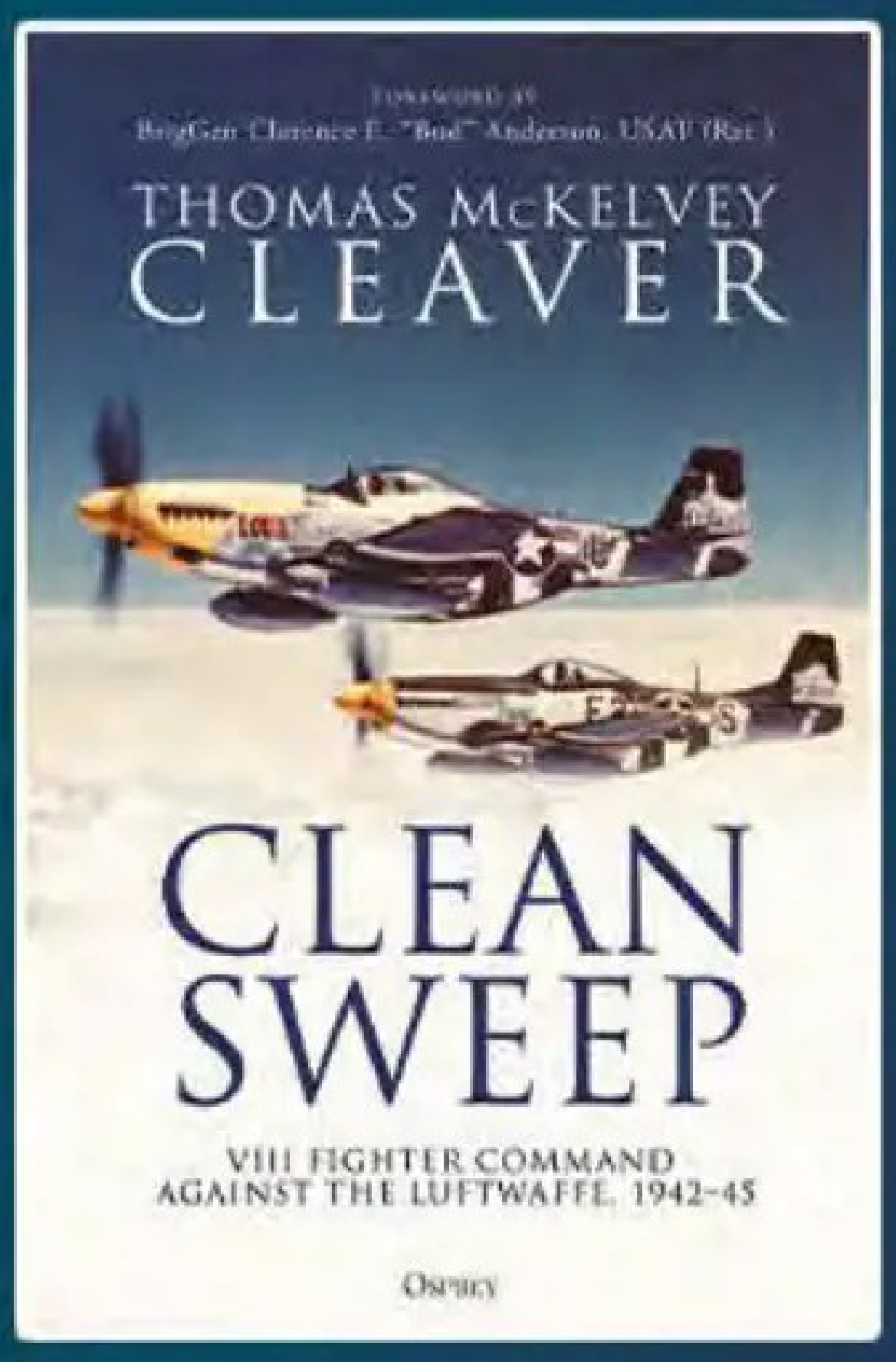
COLONEL RALPH WETTERHAHN, USAF (RET.)

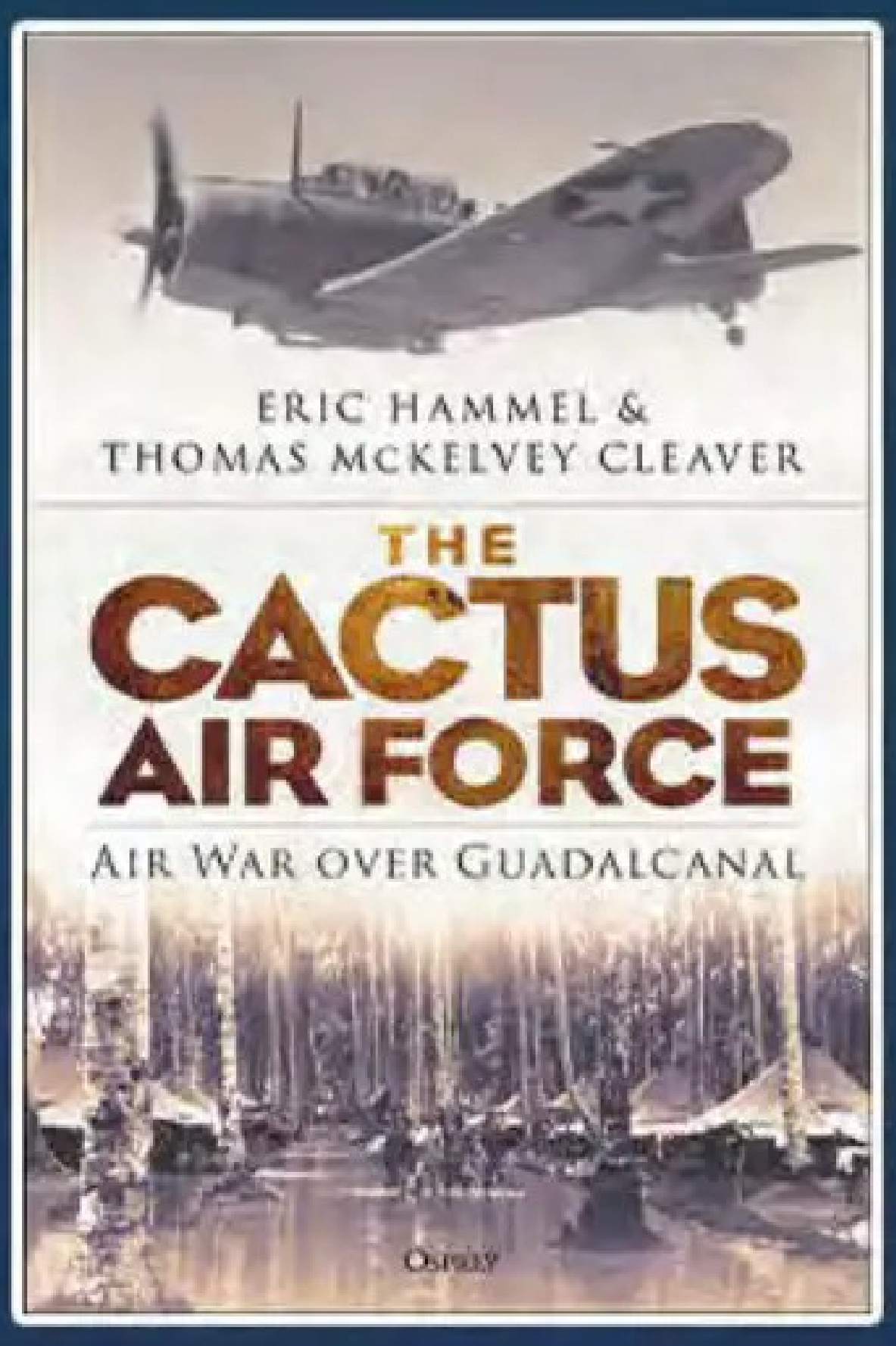
FOREWORD BY
COLONEL RALPH WETTERHAHN, USAF (RET.)
THOMAS McKELVEY
CLEAVER
MEDITERRANEAN
SWEEP
The USAAF in the Italian Campaign
OSPREY
kindle

Renowned aviation expert Thomas McKelvey Cleaver uses a wide range of first-hand accounts to bring to life the bitter struggle in the skies over Italy from mid-1943 through to the end of World War II.

ALSO AVAILABLE BY THOMAS McKELVEY CLEAVER


FOREWORD BY
RICHARD P. HALLION
THOMAS McKELVEY
CLEAVER
TURNING THE TIDE
The USAAF in North Africa and Sicily
OSPREY


THOMAS McKELVEY
CLEAVER
CLEAN SWEEP
VIII FIGHTER COMMAND AGAINST THE LUFTWAFFE, 1942–45
OSPREY


ERIC HAMMEL &
THOMAS McKELVEY CLEAVER
THE CACTUS AIR FORCE
AIR WAR OVER GUADALCANAL
OSPREY

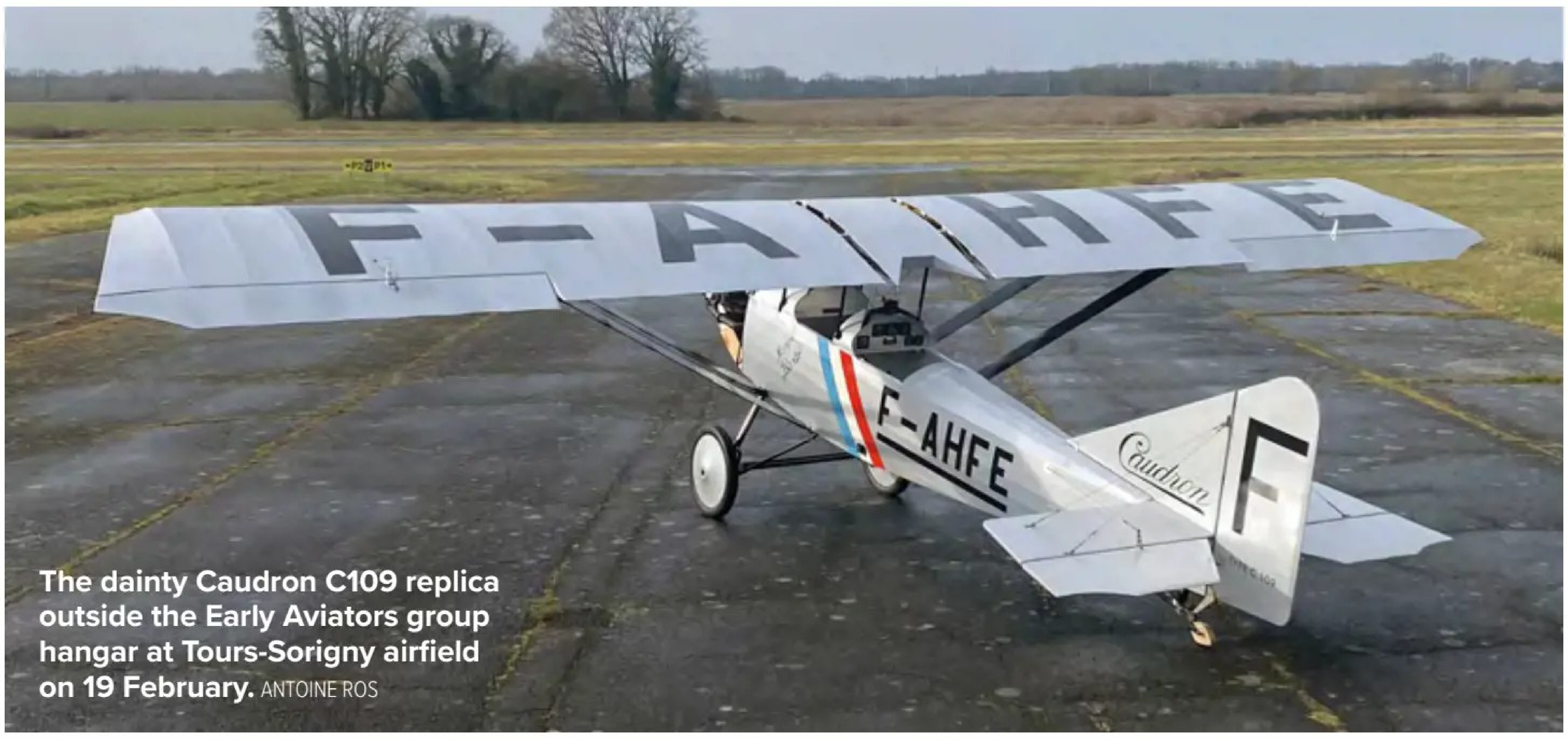
OSPREY PUBLISHING

AVAILABLE AT ALL GOOD BOOKSHOPS AND AT WWW.OSPREYPUBLISHING.COM

CAUDRON REPLICA EMERGES FOR TV DOC

A replica of the Caudron C109 parasol-winged monoplane F-AHFE, as was used by French aviator Maryse Bastié to set a women's duration record of 26 hours 47 minutes in the air during a flight from Le Bourget airport in Paris on 27 July 1929, was rolled out on 19 February by the Early Aviators group at Tours-Sorigny airfield in the Centre-Val de Loire region of France.

Early Aviators founder Antoine Ros says, "This replica has been built for a French TV documentary. It was started in April 2024, and will fly during March. It carries period-correct instruments and details, including an original Caudron magneto switch, but is fitted with a Continental C90 engine instead of the 40hp Salmson on the original C109, as I am twice as heavy as Maryse Bastié and we need to operate from a short, grass runway. The complete overhaul of an original Salmson engine would have also put us over the television programme deadline. So it's a replica, not a reproduction, even if some areas of the aircraft are 100 per cent compliant to the original drawings, including the undercarriage."



The dainty Caudron C109 replica outside the Early Aviators group hangar at Tours-Sorigny airfield on 19 February. ANTOINE ROS

YALE TO FRANCE, 85 YEARS LATE

Early Aviators has acquired the Duxford-based North American NA-64 Yale RCAF 3349/G-BYNF from Ian Jones, and after a final test flight from the Cambridgeshire airfield on 22 February the former Royal Canadian Air Force trainer is due to fly to Tours-Sorigny, where it will be repainted in Armée de l'Air markings and operated as F-AYEJ.

Antoine Ros says, "At Early Aviators, we are concerned with French aviation history. Unfortunately, no Yale — which was an advanced trainer designed for the Armée de l'Air — is currently flying in France. That is why we decided to purchase the aeroplane, which we will fly at airshows. This one was built in May 1940 but was never delivered to France."

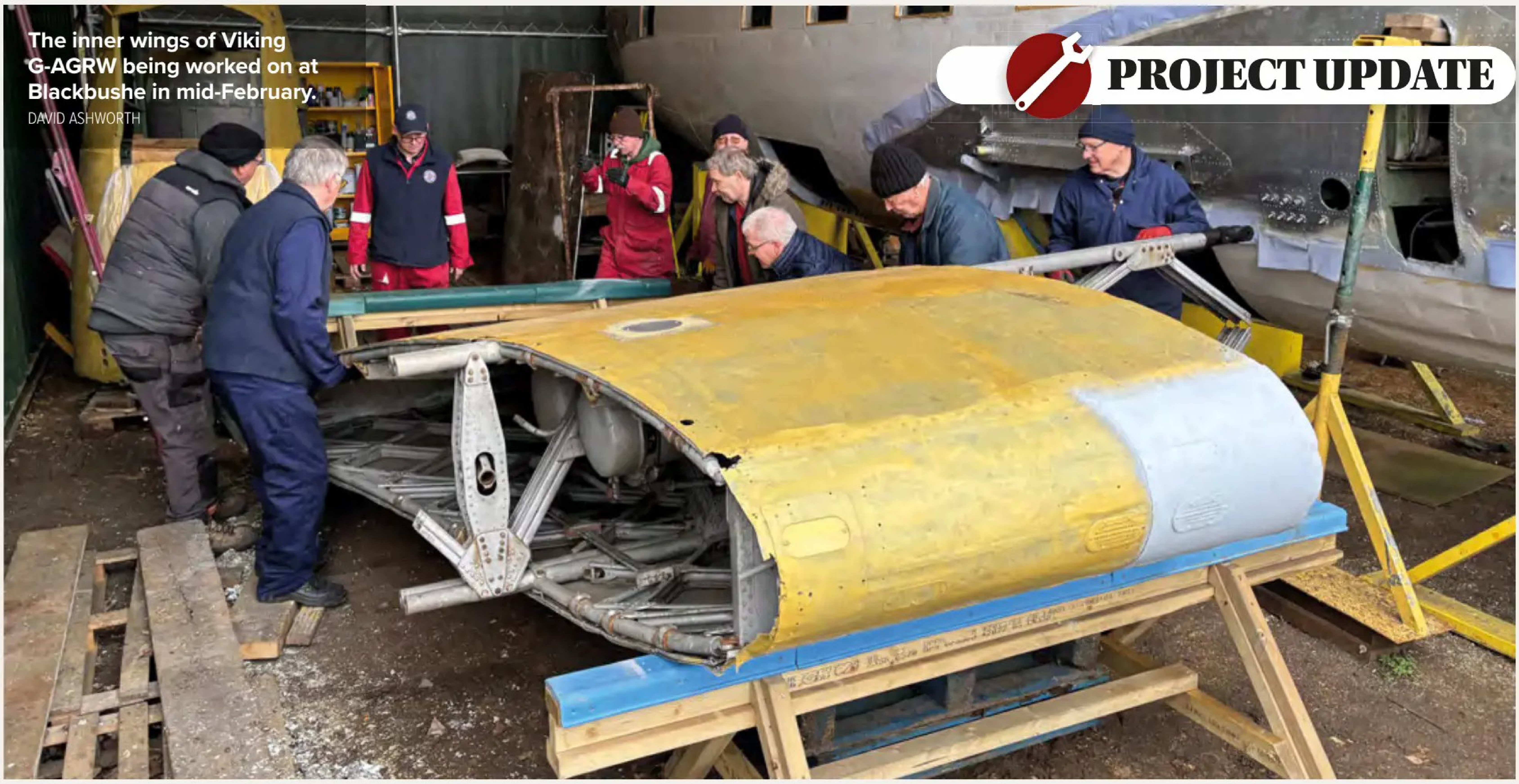
BEN DUNNELL

BELGIAN BUCHÓN BOUGHT BY RAAB

At the end of January, it was announced that Georg Raab's Flying Legends collection at Siegerland Airport in Germany has acquired Hispano HA-1112-M1L Buchón C.4K-131 from the Vormezeele family at Brasschaat, Belgium. Eric Vormezeele bought the aircraft in the mid-1980s and it has been owned by the family ever since. Eric's sons Frédéric and Alexandre run the FAST Aero maintenance and restoration business there, so it makes sense that the currently dismantled Buchón will be given a complete renovation at Brasschaat over the next couple of years. The fighter, presently registered as OO-MAF, will continue to fly with a Rolls-Royce Merlin for reasons of practicality.

By mid-March, Spitfire IX MH415, which Raab acquired last year, should have arrived in the collection's hangar. The *Battle of Britain* film veteran, stored for decades by 'Connie' Edwards at Big Spring, Texas, has been serviced by FAST Aero at Brasschaat over the past few months and will be on display at several airshows across Europe this season. ***Stefan Schmoll***

HA-1112-M1L Buchón C.4K-131, engine-running at Brasschaat back in 2005, has been acquired by Georg Raab for his Siegerland-based collection. FAST AERO



The inner wings of Viking G-AGRW being worked on at Blackbushe in mid-February. DAVID ASHWORTH

PROJECT UPDATE

Blackbushe Viking forging ahead

In mid-February at Blackbushe, Surrey, Vickers Viking G-AGRW *Vagabond* — which arrived by road from Bad Vöslau, Austria on 2 May 2023 — logged 2,500 hours of restoration work by members of the Blackbushe Heritage Trust. No fewer than 130 volunteers are led by seven trustees, with the steadfast support of Blackbushe Airport management. In charge is crew chief Phil Stonard, and not a single Wednesday or Saturday morning has passed throughout the freezing winter weather without the team working on the aircraft, often with 10 or more people at a time, including several young male and female volunteers travelling from far afield.

The Viking's main landing gear and tailwheel assembly have been entrusted to apprentices from the leading aerospace company Safran for a comprehensive overhaul to enable the aircraft to safely stand and move on its own wheels again. Anticipating the return of the main gear, the engine nacelles have been meticulously stripped and restored. Wheel bays have been primed and top-coated in green, colour-matched to the original paint.

The nose cone has been expertly repaired and painted in its original BEA livery by Hawarden Airport, Chester-based Aerocare Aviation Services. It is currently displayed at British Airways' Waterside headquarters but will be reunited with its airframe at the Blackbushe Air Day on 14 June. By then, it is hoped the inner wings will be reattached and the Viking may even be back on its newly restored undercarriage.

The inner wings were returned from Austria in March 2024. Paint-stripping, essential skin and leading edge repairs and priming are complete and they are being prepared for reattachment. Here, tradition meets new technology as four recently discovered original Wellington main spar repair plates are seamlessly complemented by four newly 3D-printed shims and plates.

The fuselage has been made waterproof and the interior thoroughly cleaned. A new cabin floor has been fitted. Damaged areas of the under-fuselage and around the baggage doors are under repair and authentic new window surrounds and trims are being used.

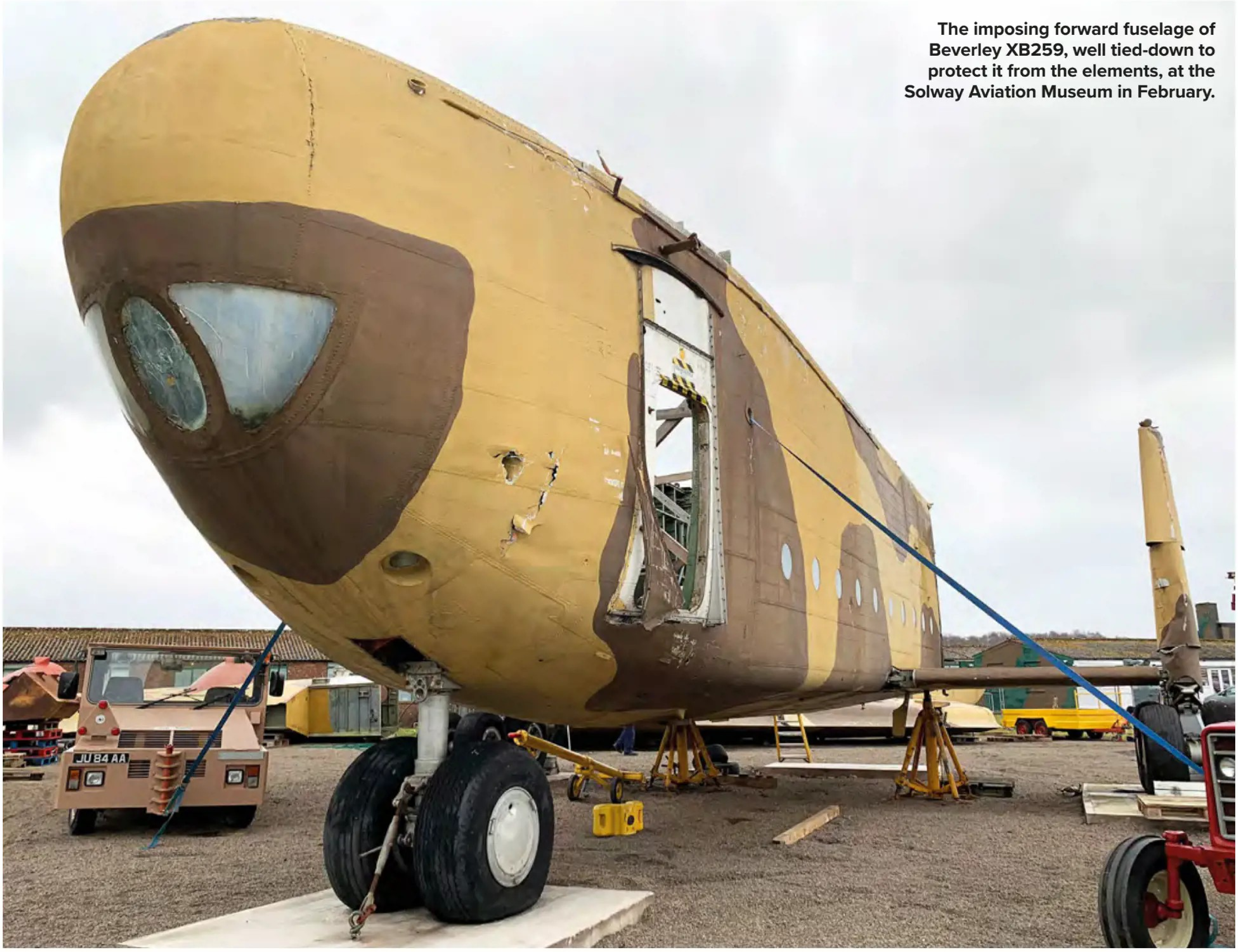
The original cockpit instruments have also been discovered. They were removed by the last pilot to fly it before the aircraft's transformation into a restaurant at Soesterberg, the Netherlands, but have now been purchased from his family to be restored back into G-AGRW. An original Viking passenger seat has been donated too. Other authentic interior components are being sourced and copied wherever possible, including the cabin light fittings which have been vacuum-formed from an original.

The team is determined to fit the inner wings, nacelles and main landing gear soon, followed by intensive work on the rear fuselage. The horizontal stabilisers and elevators are in the hands of 2Excel Aviation's apprentices for a complete refurbishment, ensuring the Viking's control surfaces are as robust and true as when it first flew.

Upon completion, the aircraft will feature a BEA livery on one side and an Eagle Airways scheme on the other, paying tribute to a major part of the type's operational history. The complete stripping of the fuselage, four layers deep, has revealed the past airline colours. This has paved the way for meticulous skin repairs and chrome etch and primer that stabilises the airframe.

The Viking's restored nose cone is presently on display at British Airways' Waterside headquarters in Harmondsworth. DAVID ASHWORTH

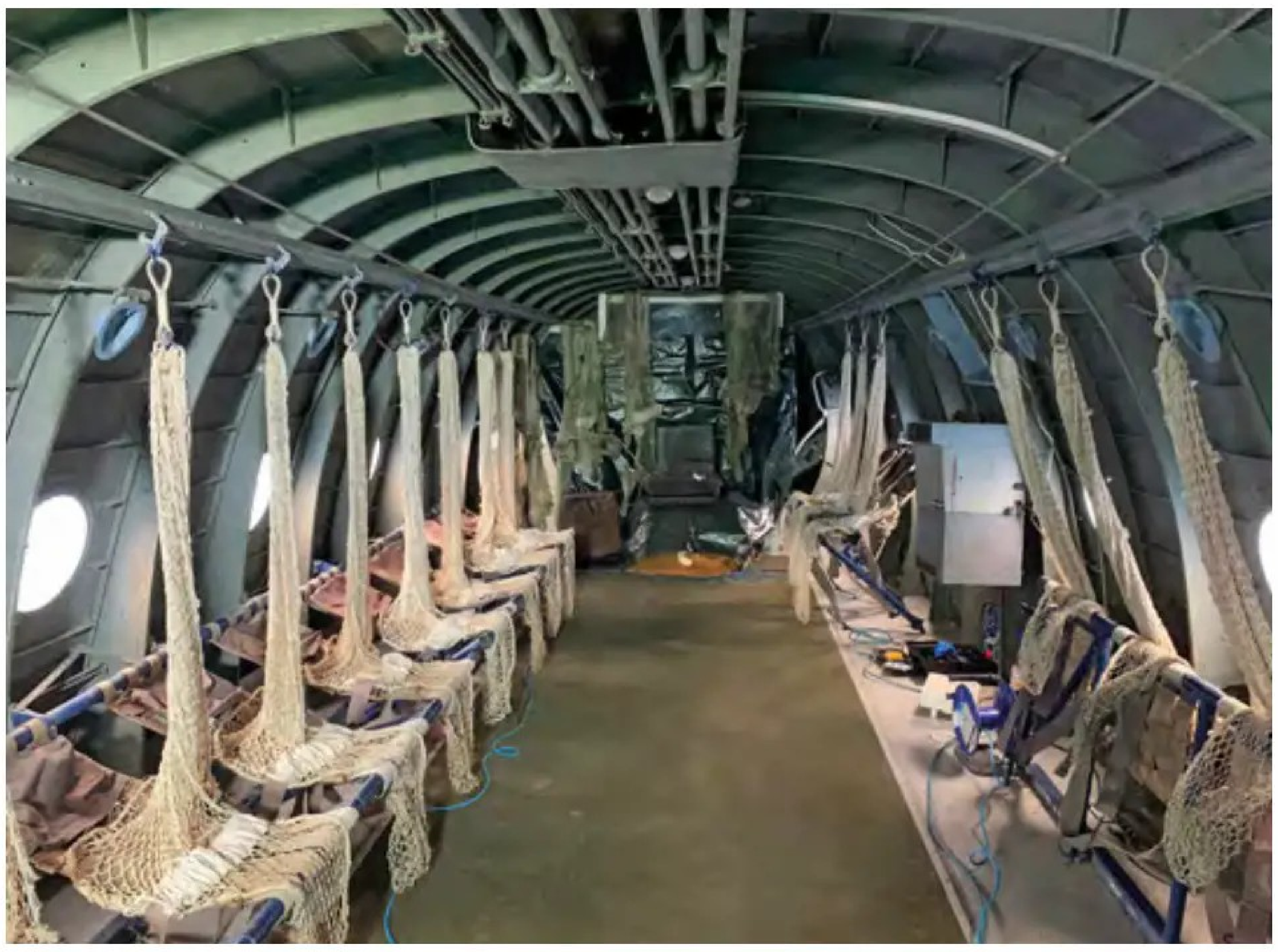
The Blackbushe Heritage Trust Shop is bringing in significant revenue to help fund this very high-quality restoration. It is open every Sunday and will be throughout the summer. The archive team, Gary Browne and Pete Vickery, has compiled a booklet entitled *Viking Reflections* to detail the recovery and restoration, the history of G-AGRW, and the type's service with BEA and Eagle. It can be purchased through eBay or the Blackbushe Heritage Trust website.



The imposing forward fuselage of Beverley XB259, well tied-down to protect it from the elements, at the Solway Aviation Museum in February.

SAVED FOR THE NATION

The Solway Aviation Museum deserves all our thanks for rescuing the last complete, surviving Blackburn Beverley from an otherwise uncertain fate. A few months after the transport was moved to Carlisle, how's its reconstruction going? **WORDS AND PHOTOGRAPHY:** BEN DUNNELL



An excellent job has already been done on the interior, with the restoration of the paratroop seats nearly finished.

Inside the workshop, engine cowling repairs are riveted by wife-and-husband pairing Gail and Martin Askew.

Enthusiasm and perseverance are great. They're very much the lifeblood of our thriving aircraft preservation scene. But, sometimes, there's no substitute for money. When it comes to oiling the wheels, making the most of that passion, cold, hard cash is invaluable. And that goes particularly for a project unique in the modern era, turned down by a host of organisations before one stepped in as its saviour.

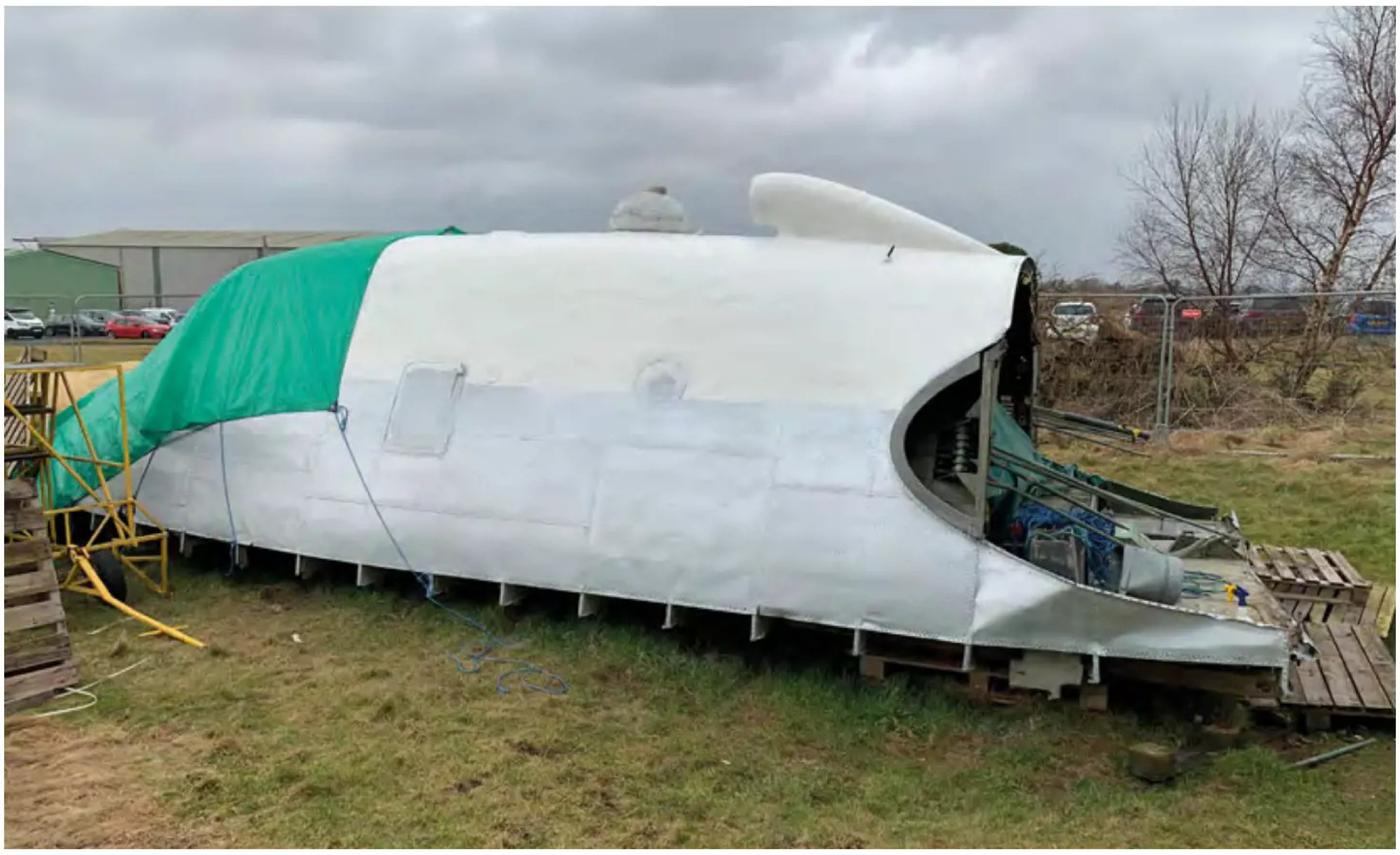
When the Solway Aviation Museum announced at the beginning of February last year that it intended to acquire Blackburn Beverley C1 XB259, the sole surviving example of the 1950s twin-tail transport, the future of this hugely important airframe was still far from certain. As the Carlisle Lake District Airport-based museum's managing director Dougie Kerr told this magazine, "We have the room for XB259 but no money". He launched a fundraising campaign with a £60,000 target to secure its move from Fort Paull, its long-time home south-east of Hull. By the end of that month, £25,000 had come in. Early April saw the appeal reaching its goal. By any standards, this was a remarkable result. A less-than-glamorous type, lacking the broad public 'pull' of, say, a Vulcan, and a call for support at a time of year when the museum was closed, Christmas wasn't long past and winter energy bills were biting — not everyone would have predicted success. But succeed it did.

Just over a year on from the initial plea, the results are there for all to see. It's a pretty desolate winter's day in the north-west, not far from the ancient city of Carlisle, yet a host of volunteers is busily toiling on projects inside and outdoors, the Beverley foremost among them. Its dismantled sections dominate part of the museum site, their sheer scale creating the feel of a daunting undertaking. Yet it's the subject of a careful, considered plan — with 170 separate items on it — to bring the big airlifter back to completion.

Thankfully the bitingly cold wind when we visited was nothing compared to Storm Éowyn, which blew in from the west on 24 January and — as briefly mentioned in last month's news pages — caused damage to the Beverley. Gusts of up to 80-90mph crossed the flat lands surrounding the airport, where the museum is situated on quite an exposed site, and broke some large sections which had been tied down to a tractor free from their moorings. "The two outer wings were lifted off the ground and blown away", says Dougie Kerr. "One landed on top of the cockpit and damaged that. The second one punctured a hole in the side of the forward fuselage. They only weigh half a tonne each, and they're designed to fly..."

> ***"There is a 170-item plan to bring the project to completion"***

None of the harm done is in any way insurmountable,



The cockpit section shows the silver-and-white RAF Transport Command colour scheme that will be adopted.

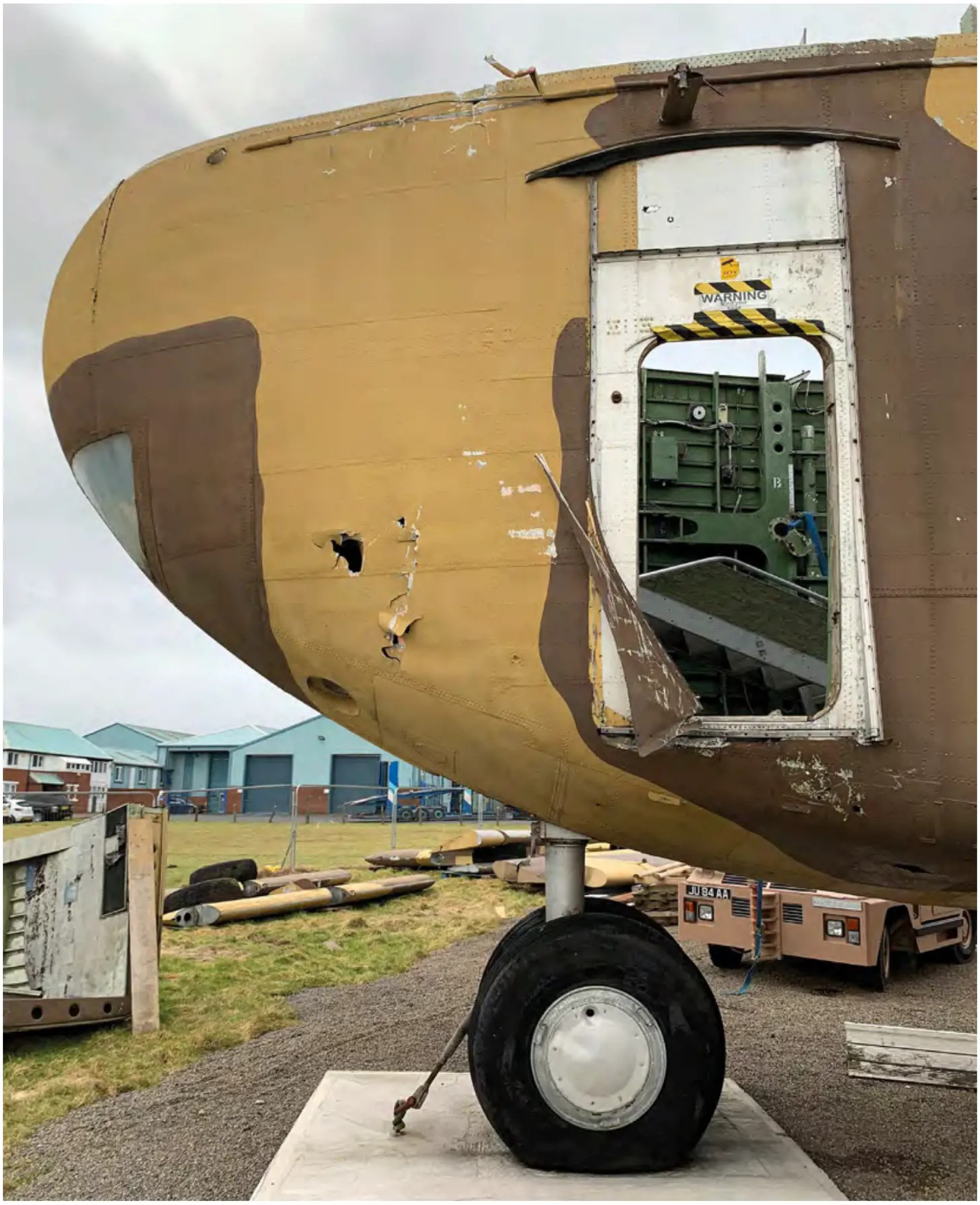
however. And it's not as if there haven't been bigger challenges in the project so far. It might have happened earlier, the Solway museum having heard in advance from Brian Dixon, secretary of Aviation Heritage UK, that the Fort Paull attraction was closing. Confirmation came in January 2020, and that September the exhibits were auctioned. A bid of £20,000 wasn't enough, beaten by a margin of just £1,000. It looked as if XB259 had slipped through the net.

The Beverley's private purchaser started dismantling the airframe, with a view to using the forward fuselage as rented holiday accommodation at a location near Selby and scrapping the rest. "Some of it was cut off rather than the bolts being taken out", says Dougie Kerr. "The engines were cut off, and the outer wings. The tail was OK, but we don't know where the nuts and bolts are, so we're going to have to remanufacture those."

Eventually, the owner's plans fell through and he decided to pass the Beverley to any museum which would have it. Some collections didn't feel able to find space, while others weren't interested. Solway was the exception. "Nobody would take it on", recalls Kerr, "and we don't know why. People were saying there was lots of corrosion in it, but the only bad corrosion we found was in the undercarriage bogies. We felt we could get them remanufactured; there's a company in Sheffield with a foundry, and they would do it. Barry Love [AHUK committee member] has sorted all that for us."

A sum of £20,000 was paid for the aircraft, but, of course, the transportation cost was very considerable on top of that. Bear in mind that pretty much everything had to be lifted over the Fort Paull wall and moved some 180-odd miles by road, using 14 articulated lorry-loads and the museum's van. That led to the crowdfunding appeal, which has now raised £120,000, double its original target.

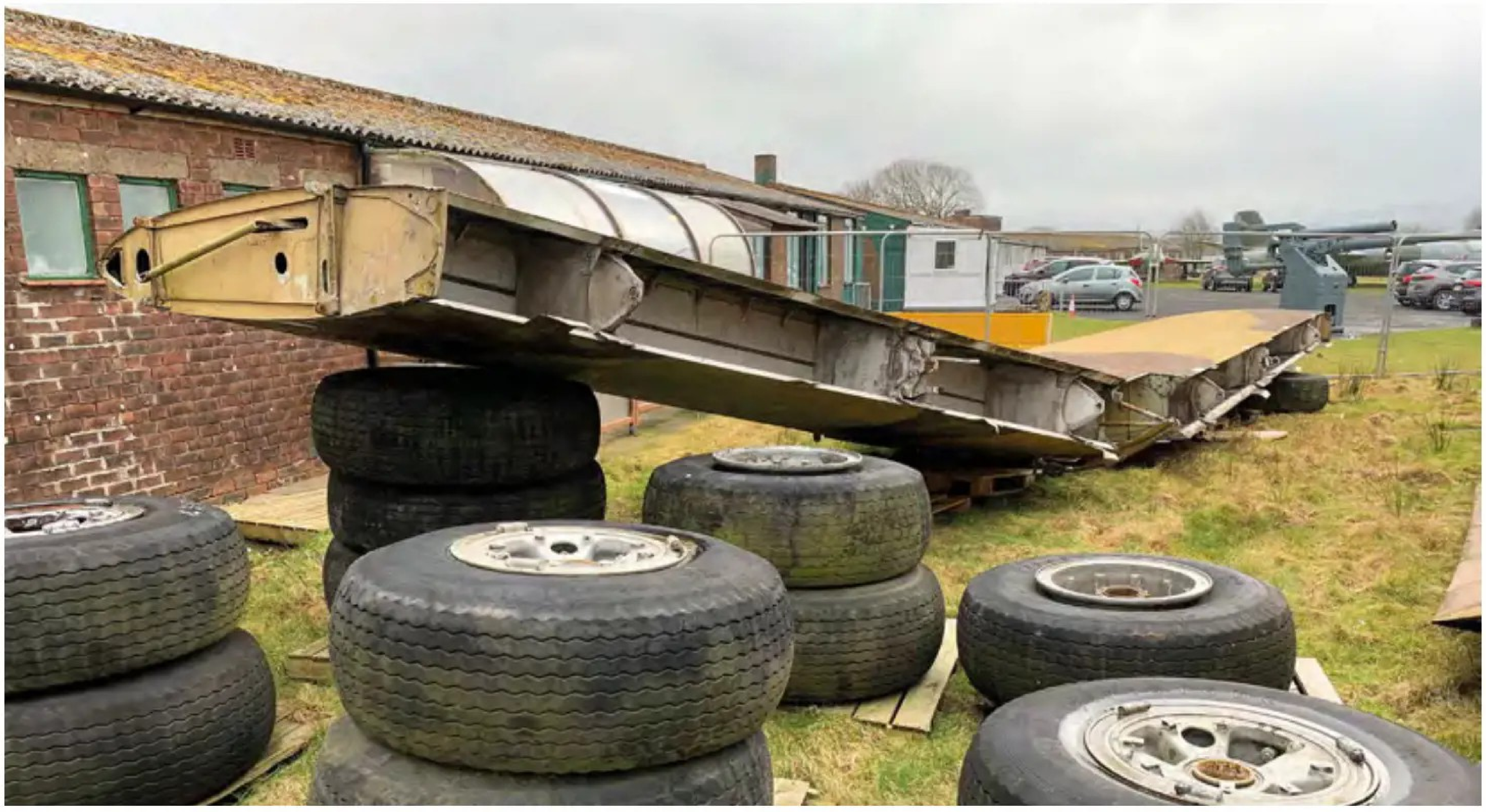
"When the money started coming in, it made it 10 times easier to do", says Kerr. "All we needed to do was pick the 'phone up and say, 'We need a crane this size', and we could get it in". One good example: "Originally, we'd have needed to get a smaller crane to take it apart inside the fort, and then another crane, a bigger one, to lift it over the top. In the end, because we had all this money we could afford the big crane for two or three days or more, and it took it all apart and lifted it over the wall."



A hole was punched in the nose when one of the wings took to the air during late January's Storm Éowyn; interestingly, the damage revealed some of the dayglo paint applied when XB259 was in RAE service. The only wooden part in the aircraft is the surround of the forward door, which needs replacing due to woodworm.

Beginning last July, that process went smoothly, those involved saying how surprised they were at the ease with which the bolts came out — so long as they weren't among those which had been cut off, that is. Now comes the task of bringing it all back together, aided by a considerable quantity of original Beverley drawings which are informing the restoration.

Larger sections will be painted before reassembly, not least because doing so on the ground is far easier than performing the task at height. Although it was never in RAF squadron service, XB259 will go into standard Transport Command colours, namely silver with a white top, rather than the later desert camouflage scheme applied while the aeroplane was at the Museum of Army Transport in Beverley. The cockpit section has already been painted, but a volunteer who's also a modeller has since said black paint should be applied beneath the silver, rather than white, so this will be taken in mind when the rest of the finish is applied. The cockpit glazing also needs reinstating after being smashed. It's been decided to use Perspex, built up to the same thickness as glass.



A few of the 22 spare wheels and tyres which came with the project — in surprisingly good condition, given how they had been sitting in water at Fort Paull — in front of the horizontal stabiliser.

Roger Scott, who's been dealing with the cockpit, says all the instruments have had to be relabelled. Over the years, damp has caused a lot of corrosion and other damage. The control columns had seized solid, as had the seats, which have been taken out, refurbished and put in storage. He's now working on the navigator's and wireless operator's stations, which were in better order. Part of the cockpit centre console has been restored, and includes some interesting switches including one to jettison the Napier Scarab rocket-assisted take-off equipment, tested on XB259 during a period back with Blackburn at Brough in 1956. The only items missing are a 'bathtub' Morse key for the

XB259: LIFE OF A SOLE SURVIVOR

1: 29 January 1955 Beverley C1 XB259, the first production example, makes its maiden flight from Brough; briefly registered G-AOAI during March; spent career passing between Blackburn, A&AEE at Boscombe Down and RAE at Farnborough and Bedford on various trials including handling, rocket-assisted take-off gear, parachute and supply-dropping, and runway aquaplaning

2: 14 March 1973 To Court Line at Luton, intended as transport of RB211 engines for its new TriStars, but never flown by the carrier

3: 30 March 1974 Makes last ever Beverley flight to Paull aerodrome near Hull, after purchase by North Country Breweries for use by Hull Aero Club as clubhouse

4: April 1983 Sold to Francis Daly and loaned to Museum of Army Transport at Beverley; moved there by road; repainted 2001 in sand camouflage

5: 22-23 May 2004 After Beverley museum closed, transported to Fort Paull for display in collection there; auctioned off September 2020 and remained until acquisition by Solway Aviation Museum; transported there July 2024

The very early days of XB259. KEY COLLECTION

Parked at Luton in Court Line's ownership. CARL FORD/AIRTEAMIMAGES.COM

Shortly after arriving at Paull airfield. KEY COLLECTION

Pride of place at a Museum of Army Transport event. KEY COLLECTION

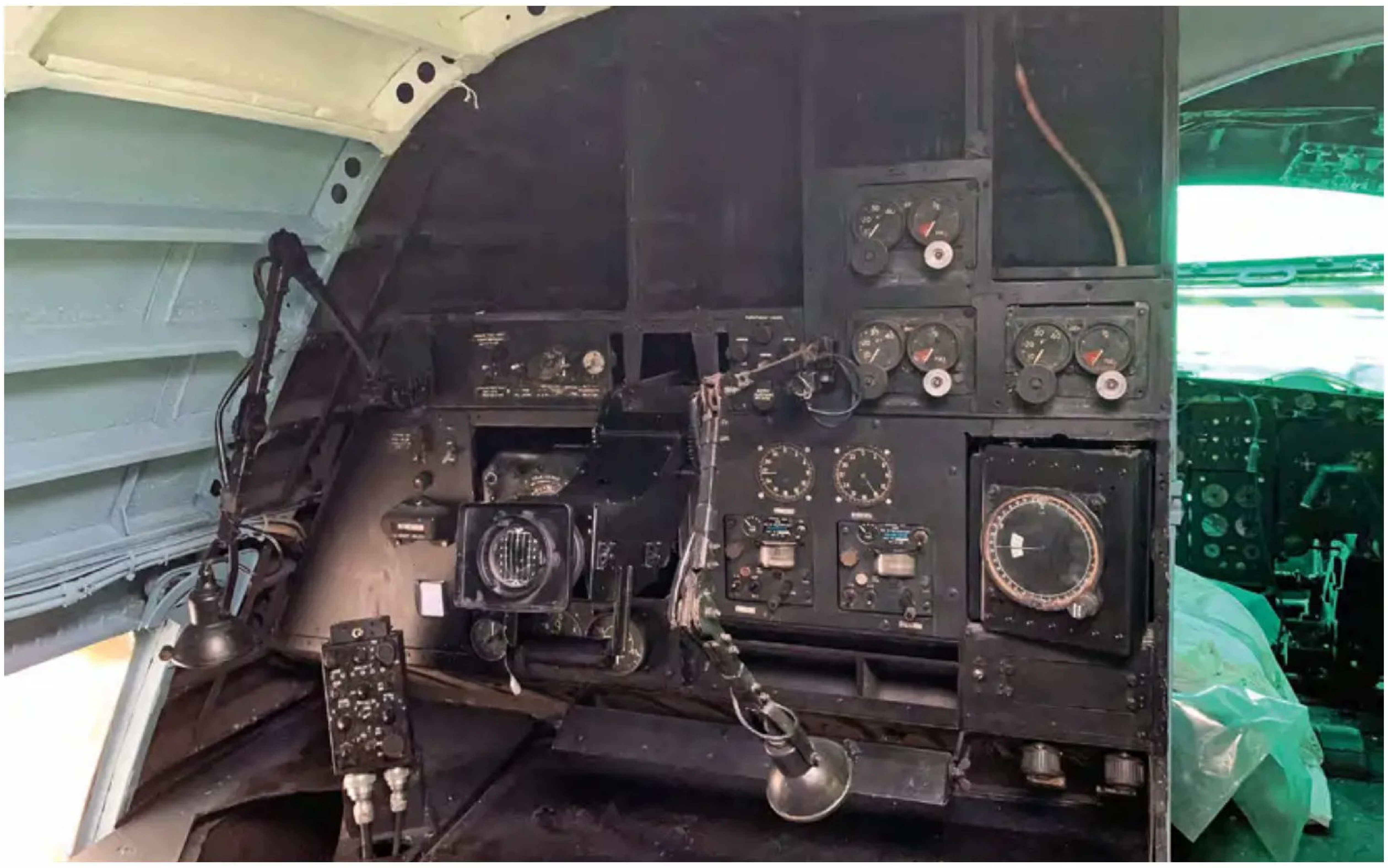
Awaiting a then uncertain fate at Fort Paull.

wireless operator and the belt-and-buckle part of the harness for his seat. If anyone can help with these, the museum would welcome hearing from you.

◆

As for the rest of it, Dougie Kerr reports, “We’re going to paint the undersides of the wings, and join the main sections of the wings together. Then we’ll have to employ a crane to come and turn them over. They’ll be supported on pallets, because the engine nacelles mean they have to be raised. After that we’ll work on the top sides. Once they’re done, the cockpit will be done, and we’ll get the crane back to put the cockpit back on first, followed by the two centre-section parts of the wing. We’ll work on the tail boom, build it up as one component and lift that up. I don’t think we’ll put it on until we’ve got the engines on, to keep the balance right. The engines need a bit of work — some of the bolt holes are still there, but some of them have been cut off.”

The Beverley will be displayed where the forward fuselage is currently positioned. The site has taken a lot of preparation, including provision of concrete blocks to put the undercarriage on. When the project is finished, the plan is to afford interior access. Two sets of steps came with XB259, not originals but those positioned with the aircraft when it was at the Museum of Army Transport. The main entrance and exit will be at the rear. One set of steps will allow visitors to climb up into the cockpit — far more practical than the original ladder arrangement.



The navigator’s station is in good nick already. Beyond, plastic sheeting creates a green glow in the cockpit.

The interior displays have not yet been decided on, but Kieron Pilbeam has nearly finished repairing and reinstalling all the paratroop seats. It’s already a considerable improvement on how it looked when the aircraft was latterly at Fort Paull, when everything was piled up in a corner of the cabin. The idea is that visitors will be able to sit in the seats. The interior metalwork is in decent condition, requiring only some cleaning rather than a full repaint.

Of the museum’s healthy total of 110-120 volunteers, about a dozen are most regularly engaged in the Beverley project, working three days a week. Sometimes they’re all there at once, sometimes not. But rapid progress is being made, and the plan shows that it will take an estimated two years until XB259 is fully ready. If all goes to plan, the four Bristol Centaurus radial engines are set for remounting in late January 2026, to be followed by the tail.

Getting the Beverley under cover is not a practical proposition at present. The museum does have some indoor display space, but there’s only enough room in it to accommodate smaller aircraft exhibits — the biggest thing in there is a Vampire T11, WZ515. “But”, Dougie Kerr points out, “if we can get a longer lease [on the museum site], this could be one of the things we go to the lottery with”. It would be a very worthy cause for lottery funding, that’s for sure.

That, though, remains a pipedream for the moment. The main thing is that the last Beverley lives, having found a home with the desire and the zeal to give XB259 the care it deserves, but didn’t enjoy for much too long. A few years ago, a major archaeological survey connected with redevelopment at Carlisle Airport made numerous notable finds from the Neolithic and Bronze Age periods. I’m not convinced the reconstruction, just a short distance away, of this relic of a more recent age isn’t just as historically significant.

For more information on the Solway Aviation Museum, visit www.solway-aviation-museum.co.uk

The Bristol Centaurus engines will be among the last items to be mounted on the airframe.

A centre wing section and the upper portion of the rear fuselage, both showing how faded the markings had become.

European Airlines Books

Messerschmitt M 18
Winning Against All Odds

MESSERSCHMITT M 18 Winning Against All Odds
Author: Rob J M Mulder
Format: 216 pages, 274 photographs, 3 cutaways, 20 colour profiles.
Price: £ 32

PULP FICTION FIGHTERS

PULP FICTION FIGHTERS Aircraft Exported to Latin America for Military Purposes, 1930-1939
Authors: Dan Hagedorn and Carlos A. Carcia
Format: 216 pages, A4, hardcover, 375 colour profiles.
Price: approx. £ 33

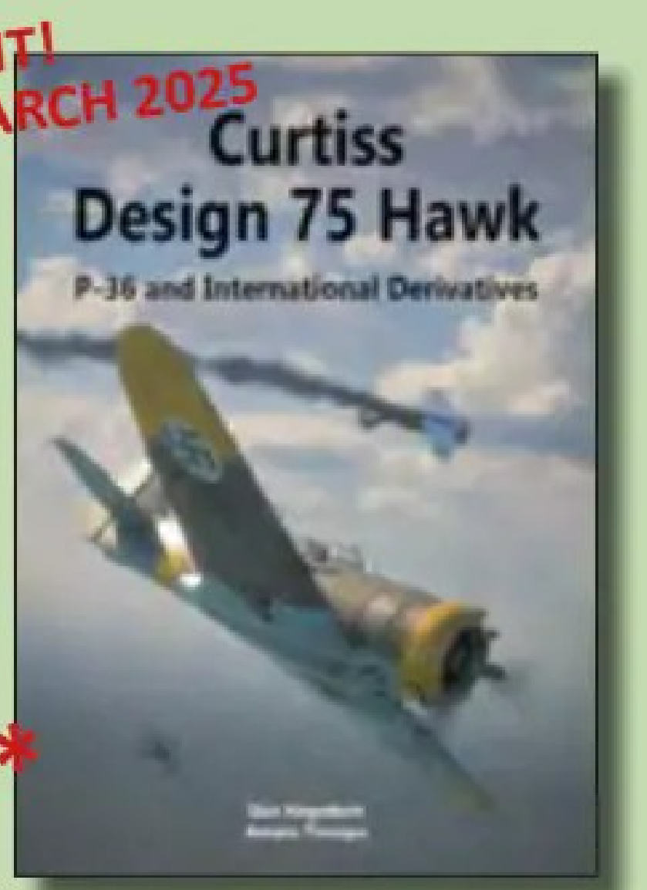
AVRO TUDOR
A Muddle without Parallel in Civil Aviation

AVRO TUDOR - A Muddle without Parallel in Civil Aviation
Author: Keith Cameron
Format: 152 pages, A4, hardcover, 157 photographs, 3 colour profiles, English language.
Price: approx. £ 29

COMING MARCH 2025

FOKKER F.XX - Fokker's Fastest Trimotor
184 pages, 210x224mm (A4), 207 photographs, of which 19 in colour, 1 cutaway (in colour), 13 drawings, 12 color profiles and 3 paintings.
Price: £ 32 *.

REPRINT!
AVAILABLE MARCH 2025



£ 39 *

CURTISS DESIGN 75 HAWK
P-36 AND INTERNATIONAL DERIVATIVES
New edition of the impressive monograph about one of the most interesting fighters of the Second World War.
Authors: Dan Hagedorn and Amaru Tincopa; **Format:** 368 pages, A4, hardback, 433 photographs, 34 color profiles.

* + pp - local VAT or custom charges not included

Order your copy now at WWW.EUROPEANAIRLINES.NO
European Airlines Rob Mulder, Norway

CA CHAUCER AUCTIONS

Chaucer Auctions run a two weekly autograph auction which includes...

Battle of Britain Pilots • Fighter and Bomber Aces • Victoria and George Cross Winners • Dambusters • RAF Escapers • Luftwaffe Aces • U-Boat Commanders • Concorde and much more!

CALL US NOW FOR A FREE CATALOGUE!

We are always interested in buying collections or putting them into auction.

See our next sale at our new website **www.chaucerauctions.co.uk** or call us on **0800 1701314**

SOLWAY AVIATION MUSEUM

TAKE A STEP BACK IN TIME

Whether you see yourself as an aviation enthusiast or simply a curious explorer, Solway Aviation Museum has something to offer.

Based on the site of RAF Crosby-on-Eden, a former WWII fighter base, the museum has been painstakingly created by a team of highly committed volunteers over a fifty year period. The museum tells the story of aviation in the region, its airfields, its characters and its vital role during WWII.

The museum is also home to the mighty AVRO Vulcan XJ823 along with a growing collection of British military aircraft which were designed and built in Britain during the Cold war. The museum also exhibits many thousands of items from aircraft engines to the Bluestreak Rocket programme.

The museum is open from 21st March to 29th October on Friday, Saturday and Sundays from 10.30 to 17.00 last entry 16.15 hrs, see our website for more information:

www.solway-aviation-museum.co.uk

OPEN ALL BANK HOLIDAYS

T. 01228 573 823 E. info@solway-aviation-museum.co.uk

Solway Aviation Museum, Aviation House, Carlisle Lake District Airport, Crosby-on-Eden, Cumbria CA6 4NW

STEVE SLATER

HangarTalk

A vintage light aircraft aficionado’s view on historic aviation

January of this year marked a milestone in aviation. The Boom Supersonic XB-1 demonstrator broke the sound barrier for the first time, reaching Mach 1.122 at 35,290ft over Califonia’s Mojave Desert. Never before had an independently developed civilian aircraft reached a supersonic speed. The prototype is now carrying out a series of even faster supersonic test flights as it further expands its design envelope.

Boom’s ultimate design, the Overture airliner, will carry 65 to 88 passengers at 60,000ft. The company has already built a new factory in North Carolina, which is scheduled to produce 66 aircraft a year for airlines such as American and United in the USA and further afield, such as Japan Airlines. Boom claims to have secured 130 Overture orders and pre-orders with global carriers.

Of course, we British — and French — have seen it all before. The initial Anglo-French Concorde prototype made its maiden flight in March 1969 and 14 production aircraft criss-crossed the Atlantic Ocean until the type was retired by Air France and British Airways during 2003. All but two of the series Concordes built are still extant, perhaps a record for a production type.

Boom Supersonic’s Overture concept certainly looks the part, but will it reach fruition? BOOM

To compare the two types, Concorde was principally of alloy construction and had greater capacity, being designed to carry between 92 and 128 passengers. Supersonic flight more than halved travel times, but sonic booms over the ground limited it to trans-oceanic routes only. Over land, in order to avoid the dreaded ‘boom’, Concorde was restricted to subsonic speeds. One flight British Airways Concordes were famous for was the regular Saturday-morning trip to Barbados. On arrival, the aircraft would traditionally carry out a low-level lap of the Caribbean island in order to ‘show the flag’ to British and American tourists alike, before landing at Grantley Adams International Airport.

> *Of course, we British — and French — have seen it all before*

Things have moved on quite a bit, the Boom Overture having been designed to make the most of composite materials. Unlike Concorde, which used a variant of the mighty Rolls-Royce Olympus — as was also employed in non-afterburning form on the Avro Vulcan — the Overture is powered by an engine of the aircraft manufacturer’s own design.

Mainstream concerns such as General Electric and Pratt & Whitney have eschewed the Overture and its motive power, leaving the maker to ‘go it alone’. Each of its four Symphony engines develops 35,000lb of thrust. A modern turbofan design, it is optimised for supersonic cruising and the engine has rapidly progressed through design and into hardware testing.

It has to be said, though, that the engine and its novel background are regarded by many as the project’s weak point. If technical problems with the powerplant were to be uncovered down the line, the manufacturer might not have the resources to cure them. So far, such difficulties have not been uncovered.

In addition to the engines, Boom unveiled an all-new flight deck for the Overture, designed around pilots with safety at the forefront. According to Boom, it builds upon years of learning in aviation safety and is the result of extensive feedback received from airline, corporate and military pilots.

The new delta-winged airliner will hopefully be an exciting addition to the scene. There is a British element too. Boom worked with BAE Systems to integrate its active control sidesticks into the Overture design. A direct link can thus be traced back to the previous incarnation of commercial supersonic travel, even if in a small way. From an historical perspective, there’s something pleasing about that.

PIMA AIR & SPACE MUSEUM

6 Hangars – 80 Acres – 425 Aircraft

Soaring Through History

www.pimaair.org

I-10 to Exit 267 - 6000 E Valencia Rd. Tucson, Arizona - 520 574 0462

TITAN MISSILE MUSEUM

Bring More History to Life at titanmissilemuseum.org

Two world-class museum experiences in Southern Arizona

PIMA AIR & SPACE MUSEUM

THE AVIATION BOOKSHOP

The Aviation Bookshop - at the service of all aviation enthusiasts since the 1940s

The Aviation Bookshop,
OFFICE 1G C/O STORAGE KING,
Longfield Road,
North Farm Estate
Tunbridge Wells,
Kent, TN2 3EY
UNITED KINGDOM

☎ 01892 539284 (international: +44 18 92 53 92 84)

info@aviation-bookshop.com

www.aviation-bookshop.com

Payment Methods
Cheques made payable to The Aviation Bookshop
or you can pay via PayPal using info@aviation-bookshop.com
All major credit cards accepted

UK Postage & Packing
Postage charged at cost.

Overseas Delivery Charges
Postal charges are made at cost price to The Aviation Bookshop. We are unable to detail exact postal charges as orders are treated individually and the applicable charge is calculated accordingly.

NEW LOCATION!

Due to the sale of our building The Aviation Bookshop has moved location and is now trading from:

**OFFICE 1G C/O STORAGE KING, Longfield Road,
North Farm Estate, Tunbridge Wells, Kent, TN2 3EY**

We are now open for business and look forward to seeing customers new and old in our new location.

- We are now open **Monday to Friday** from **10am to 4pm (Saturday by appointment)**
- Parking available onsite and in **Longfield Road**
- Nearest train station is **High Brooms** which is a **15-minute walk away**

To mark our new location, we will be running a 50% SALE of all books NEW & SECOND-HAND for all walk-in visitors for all of APRIL 2025

Following this our annual online sale will occur in May with 25% OFF all New and Second-hand books - please use the following code when placing your order:

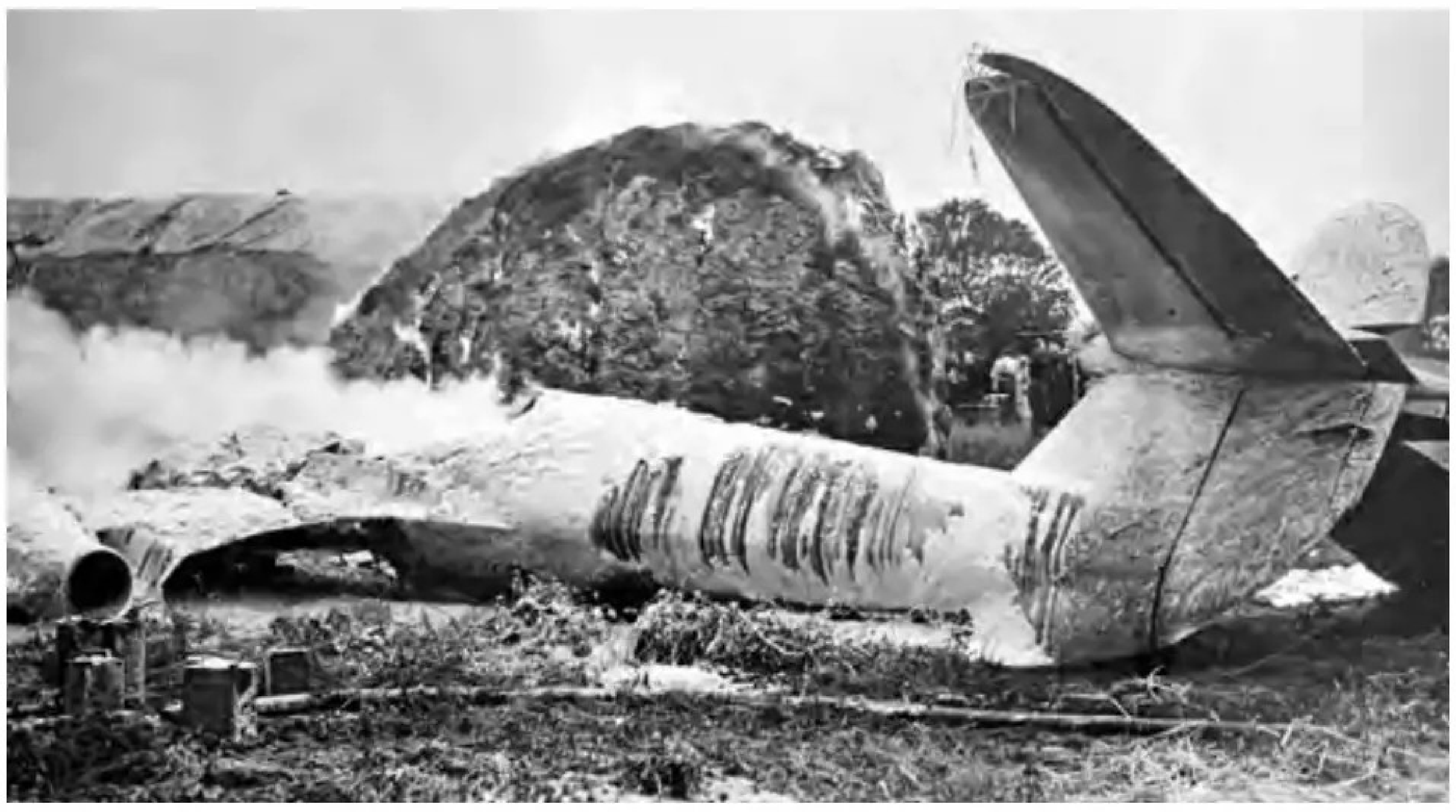
25%OFFNEW

DENIS J. CALVERT

FlightLine

Recollections and reflections — a seasoned reporter's take on aviation history

Two aircraft vie for the accolade of being the world's first operational jet fighter: Messerschmitt's Me 262 and Gloster's Meteor. While the Me 262 achieved a few air-to-air kills in the summer of 1944, neither made any significant impact on the outcome of the war. Post-war, a number of Me 262s were taken to Britain and the USA for evaluation but the type's flying career very soon ended. Apart, of course, from the small batch of replicas produced in the USA in the early 2000s. Not so that of the Gloster Meteor, which was developed in a plethora of versions, single- and two-seat, and went on to achieve a production run in excess of 3,800 examples.



Just one of the 890 RAF Meteors lost: MkIII EE362 of No 56 Squadron, which crashed at Bolton Percy while approaching to land at Church Fenton on 23 August 1946. The pilot, WO F. V. Ryans, walked away. ALAMY

The Meteor has proved a popular subject in the aviation press with coverage from all angles. One such volume is Nick Carter's excellent *Meteor Eject!* (Woodfield Publishing, 2000). The author, who survived his own Martin-Baker experience in an F8, gives a good account of flying the Meteor in RAF squadron service in the '50s, and includes an appendix with a listing of crashes compiled from record cards at the RAF Museum. This reveals the loss of 890 (not a misprint) Meteors between July 1944 and May 1986, involving the deaths of almost 450 aircrew. On one day, 18 June 1951, RAF Biggin Hill lost three Meteors and three pilots during what was planned as a celebration of Waterloo Day. F8 WB110 of No 41 Squadron was in a stream take-off but failed to gain height and crashed into a bungalow. Two F4s, VT275 and VT281 of No 600 (City of London) Squadron, then collided overhead the airfield while circling the wreckage, the remains of all three aeroplanes ending up within a 100m circle. This loss rate would be — and should be — completely unacceptable in today's RAF, but in the 1950s it was taken as the price to be paid for operating advanced jet aircraft during a rapid build-up of its front-line strength. However bad it was, it did little to stem a flood of applications from would-be RAF fighter pilots.

> **“It was the price to be paid for operating advanced jet aircraft”**

The Meteor failed to distinguish itself in the Korean War, where the Royal Australian Air Force's No 77 Squadron found its F8s outclassed by the opposing MiG-15s, leading to the type's premature withdrawal from the air combat role. A song frequently heard on the squadron at the time had the refrain, “All I want for Christmas is my wings swept back, my wings swept back, my wings swept back”. The pilots' heartfelt wish would only be granted in November 1957 with the arrival of the first Australian-built, Avon-engined, Sabre.

A strange story revolves around two ex-RAF Meteor night fighters. In July 1969, NF14 G-ASLW, which Rolls-Royce had been using for photographic chase and continuation training, was innocently sold for just £5,500 to a person saying he represented an aircraft museum. Just a month later, a second NF14, WS804, which had been retired by RAE Bedford was bought by another individual who claimed connections with a film company. Flown to Blackbushe, WS804's military markings and dayglo stripes were removed, to be replaced by civil registration G-AXNE and the large, fictitious legend ‘ENTERPRISE FILMS’ painted on the forward fuselage. HM Customs' suspicions were aroused that both aircraft were intended to be delivered to Biafra for use in the Nigerian civil war. In the event, neither reached its destination. G-AXNE got as far as Bissau but was effectively impounded there after the application of political pressure. G-ASLW fared even worse when its pilot, attempting an over-ambitious overwater leg to Bissau, ran out of fuel and was forced to ditch in the Atlantic. Perhaps inevitably, a court case followed, when some of the murky story finally started to emerge.

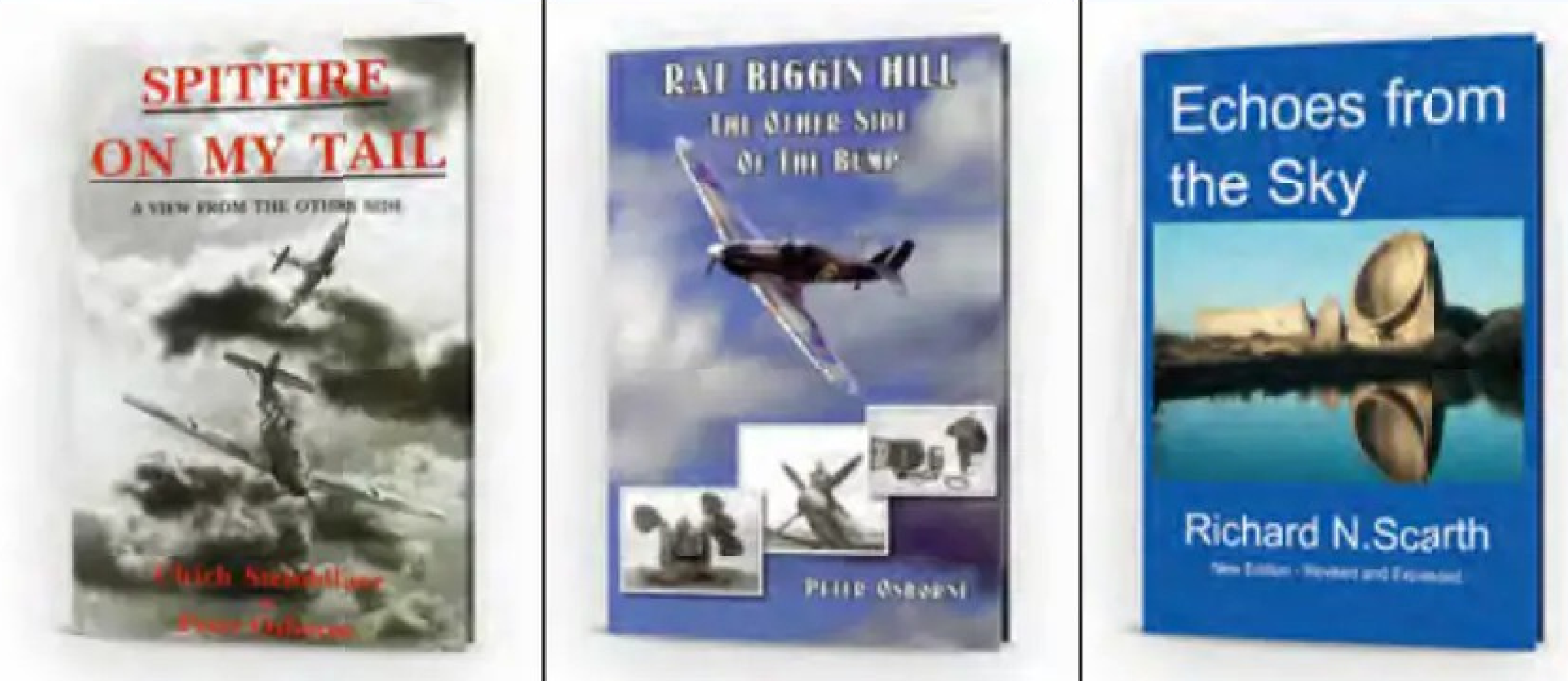
AEROPLANE

To advertise please contact:

Sarah Elmore
sarah.elmore@keypublishing.com
01780 663011
Ext.117

AEROPLANE
HARRIER
AEROPLANE
TSR2
THE FINAL RECKONING

Independent Books
Re-released by popular demand



Spitfire on my Tail
by Ulrich Steinhilper and Peter Osborne
"Spitfire On My Tail" is the detailed account of how one German grew up and joined the Luftwaffe as a career officer and airman. It was written by Ulrich Steinhilper who was an Oberleutnant with JG 52 (52nd Fighter Wing) based at Coquelles near Calais.

RAF Biggin Hill
The Other Side of the Bump
by Peter Osborne
Often known as the 'Most Famous Fighter Station' in the World', Biggin Hill has a rich and virtually unknown history behind the scenes.

Echoes from the Sky
by Richard N.Scarth
Following the air raids of WW1, Britain was left with no effective warning of the approach of enemy aircraft, other than the human eye and ear. Acoustic Defence was based on battle field gun ranging and used highly developed technology to track aircraft twenty years before the emergence of RADAR.

Order from Crecy Publishing at: crecy.co.uk
or visit our website: www.indbooks.co.uk

BRAVO DELTA MODELS
THE WORLD'S FINEST HAND CARVED MAHOGANY MODELS

LIMITED EDITION

F16-AM Dream Viper
Very Limited Edition Belgian Airforce F16-AM Viper. Over 100 hours of work making it one of the most challenging models we have ever attempted.

FA-87
BELGIAN AIR FOR

ORDER YOURS TODAY, available only whilst stocks last
www.bravodeltamodels.com or call **01884 861011**

RICHARD CROCKETT

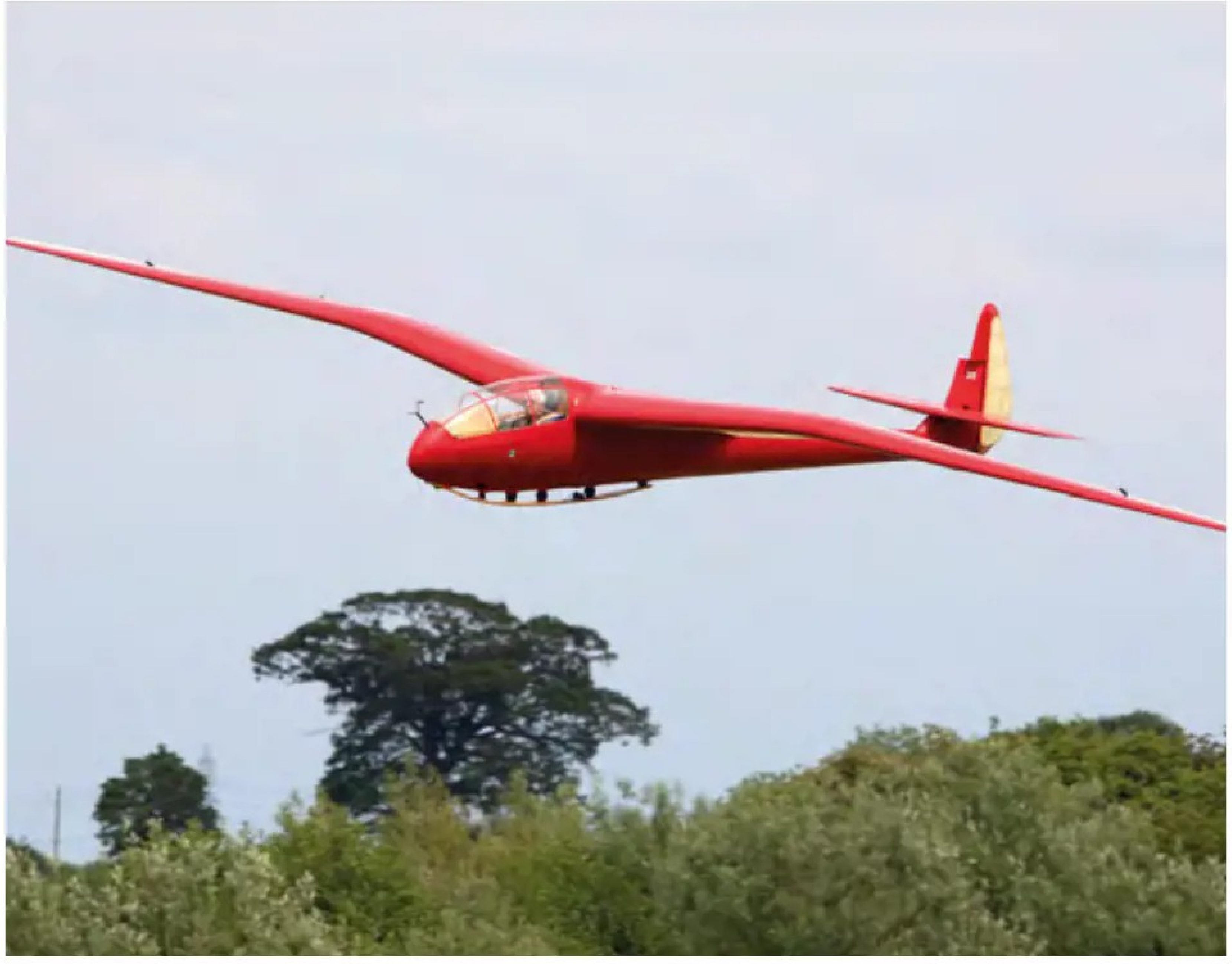
From the Cockpit

Join one of Shuttleworth's newest pilots on his vintage flying journey

One of Shuttleworth's stand-out features is the incredible variety of aircraft on display at every event. And in addition to their powered counterparts, sailplanes have become a regular highlight at Old Warden shows. Indeed, the collection proudly owns a small fleet of its own vintage gliders such as the Fauvel AV36, Elliotts of Newbury Primary and Slingsby Kite 1. Alongside these, visiting historic gliders are displayed and one such favourite is Graham Saw's magnificent Slingsby T13 Petrel, one of only two remaining in the world.

For those who are unfamiliar with the design, the Petrel is a single-seat, cantilever gull-wing competition sailplane built in the late 1930s. Painted in a stunning Post Office red with clear fabric wings, it creates an especially fine spectacle during an evening display at Shuttleworth as the setting sun catches its finish.

The Petrel's design is inspired by an early-1930s German sailplane, the Schleicher Rhönadler, which was considered world-leading at the time. Unfortunately, since the Petrel came into existence just before the outbreak of World War Two, the subsequent seven-year hiatus in sporting aviation quickly rendered it obsolete, with only three ever produced.



Graham Saw's delectable Slingsby Petrel, possessor of one of aviation's loveliest gull-wings. BEN DUNNELL

Of the three built, just two remain for the prototype suffered a serious accident at Camphill in July 1939 when it crashed killing its pilot, speedway rider Frank Charles.

> ***"The Petrel is undeniably one of the most beautiful sailplanes ever built"***

The cause of the mishap was found to be a faulty winch hook which rendered Charles unable to release. While undoubtedly a tragedy, it did give rise to the automatic release hook which, as the name suggests, releases the winch cable as soon as any rearwards pressure is applied. Today these devices, known as TOST hooks, can be found fitted to virtually all sailplanes.

From a pilot's perspective, flying the Petrel is an absolute delight, whether during a display or while enjoying a leisurely soaring flight. It can be launched via winch, aero-tow, or even bungee. In aero-tow operations, the Petrel features a pair of Spitfire tailwheels that attach to its skid, allowing for brisker acceleration and a shorter take-off run. However, their time in contact is fleeting — as soon as the aircraft is airborne, you pull a cockpit lever labelled 'Jettison', causing the wheels to drop to the ground. Great care must be taken to release them at precisely the right moment, to avoid any risk of their bouncing back and striking the fuselage.

Once in the air, the Petrel is utterly graceful. Even without elevator trim, its controls remain light and responsive, making long soaring flights a pleasure. Thermaling in particular is an enjoyable experience, as pilots can spend time admiring the elegant gull-wings while keeping a watchful eye on any other gliders that have joined the same thermal.

Inevitably, gravity calls and a landing must be made. Thanks to a combination of sideslipping and top-surface spoilers, the Petrel touches down with ease. On the ground, its skid engages, abruptly ending the flight with a noticeable jolt.

Overall, the Petrel is undeniably one of the most beautiful sailplanes ever built. If you haven't seen it in person, take a moment to admire its design when you eventually do so. And if you're ever lucky enough to fly it, savour every single second. Gliding truly doesn't get any better than this.

LINCOLNSHIRE AVIATION HERITAGE CENTRE

LANCASTER

& MOSQUITO TAXY RIDES, LIVE EXPERIENCE DAYS

UNIQUE experiences with AVRO Lancaster NX611 & Mosquito HJ711

Now booking 2025 dates

B25 Mitchell experiences coming soon!

Check the website for details

- Interior tours
- Photographic events
- Taxy rides
- Restoration tours

East Kirkby Airfield, East Kirkby PE23 4DE
Tel: 01790 763207

www.lincsaviation.co.uk

Skywriters

In association with... Crécy
www.crecy.co.uk

WRITE TO: *Aeroplane*, Key Publishing Ltd,
PO Box 100, Stamford, Lincolnshire PE9 1XQ, UK
E-MAIL TO: aeroplane@keypublishing.com,
putting 'Skywriters' in the header

In every issue, the writer of our Letter of the Month wins a **£25 book voucher** to spend with leading military and transport publisher Crécy.

LETTER of the MONTH

For some reason it took me quite a long time before I read the feature 'Measure for Measure' on No 214 Squadron's Fortresses in the November 2024 issue and, well, it was quite a surprise to see my father Ken Phelan's words! Before he passed away he was very keen for his experiences to be shared, so thank you.

There was, however, a sequel to the story that really only came to light in the past 20 years, and then it was not completely clear as to what had happened. It had been unknown how the non-surviving members of the crew, who bailed out, had died. It appears from some notes I have that four of them were located in a church at Elstorf and one, Harry Henderson, was found in Moisburg.

A letter from John Mathews, a survivor who was in the Royal Australian Air Force, written in 2004 explains that he and Harry were set upon by German civilians with pitchforks. John himself was injured and managed to escape but Harry was never seen again. My father, who was injured from his escape and conscious for a short while, overheard Harry's screams and assumed it was the Gestapo attacking his colleagues.

John never told this story as he did not want to bring added anguish to the families. He was firmly of the opinion that the same fate befell the rest of the crew. I have seen a comment that, "it was kind of the local villagers to give the enemy who came to bomb them a quick and proper burial."

Once again, thank you for the article. We really cannot comprehend what these men — and boys — went through.
Terry Phelan

In the centre of the back row here is Ken Phelan, during his gunnery training.

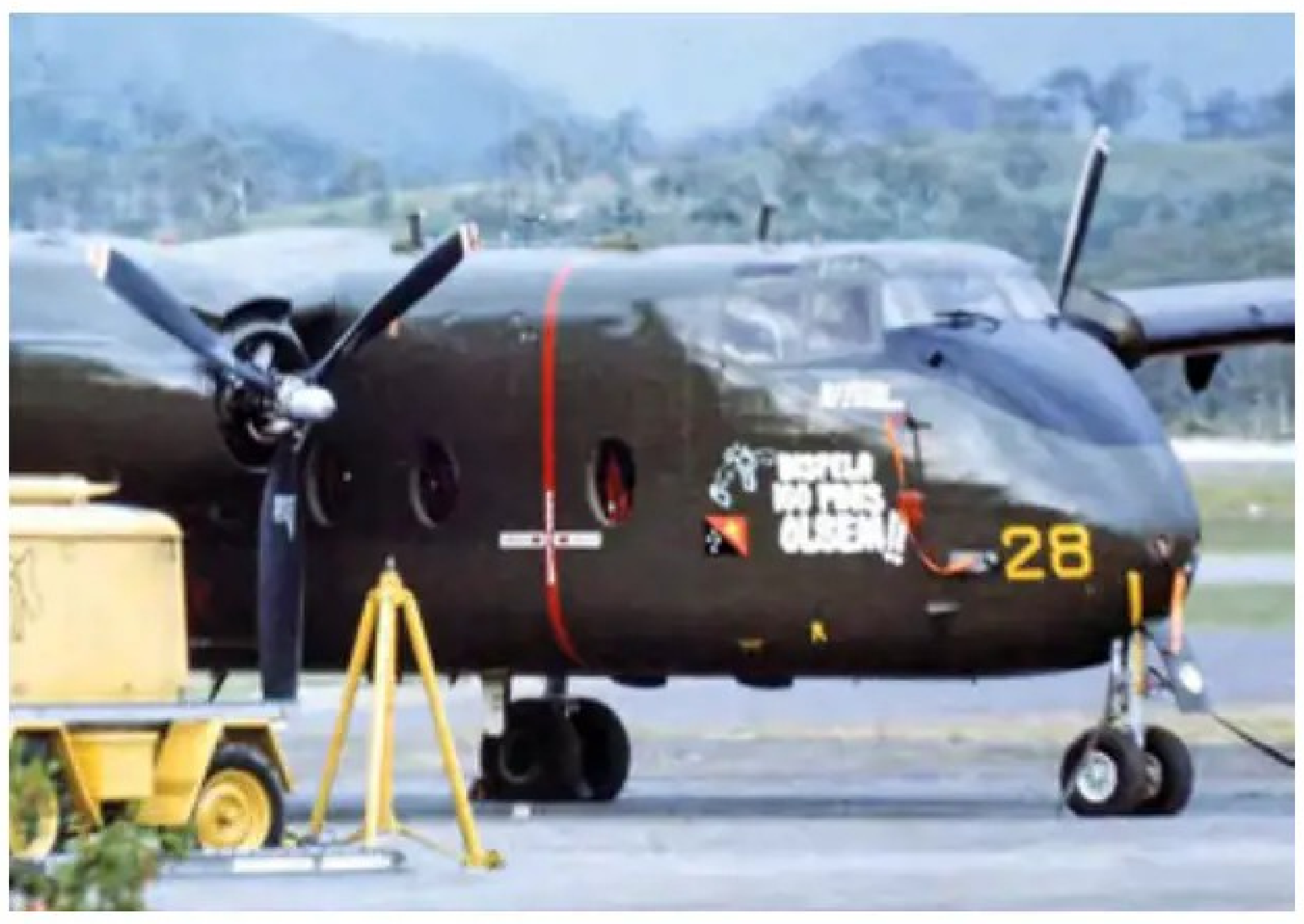
Having just finished Don Dwiggins' biography of Paul Mantz, the January 2025 Personal Album was of particular interest. Readers might be interested to know Mantz won the 1946 and 1947 Bendix Air Races in Mustang N1202/NX1202, and the 1948 race in N1204/NX1204. Both of these were part of a post-war job lot of a reported 475 aircraft Mantz and his backers acquired for $55,000 — they had originally cost US taxpayers $117,000,000.

Dwiggins states that after the purchase Mantz's fleet comprised 75 B-17 Flying Fortresses, 228 B-24 Liberators, 10 B-25 Mitchells, 22 B-26 Marauders, eight P-51 Mustangs, six P-39 Airacobras, 31 P-47 Thunderbolts, 90 P-40 Warhawks and 30 other types — a total of 500 aeroplanes, so possibly this included his existing fleet. At that time only the governments of Australia, Canada, France, Russia, the UK and USA could claim to operate more combat aircraft.

Mantz originally planned to pick the best 75 aircraft to join his fleet and scrap the rest. Sadly, due to the tight deadline to remove the war-surplus airframes, he was only able to move a dozen to his base in time.
Desmond Markus

P-51C NX1204, the 1948 Bendix race winner in Paul Mantz's hands.
SDASM

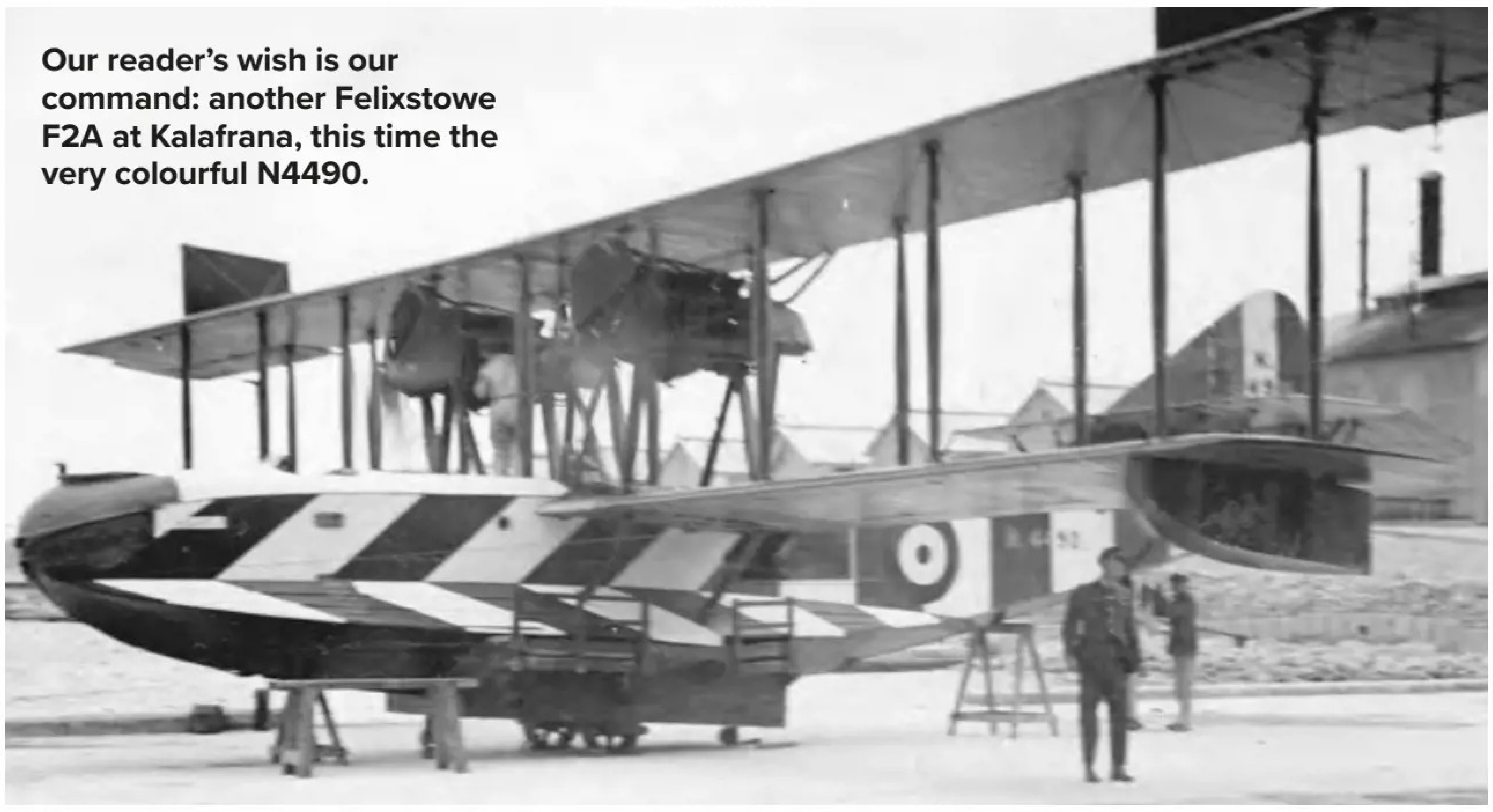
I enjoyed James Kightly's account of the DHC Caribou in the October issue of *Aeroplane*. Among other things, after 46 years or thereabouts, I have discovered the provenance of the United Nations Caribou I saw at Srinagar, Kashmir, in May 1978!


Nose art out of the ordinary on RAAF Caribou A4-228 at Port Moresby.

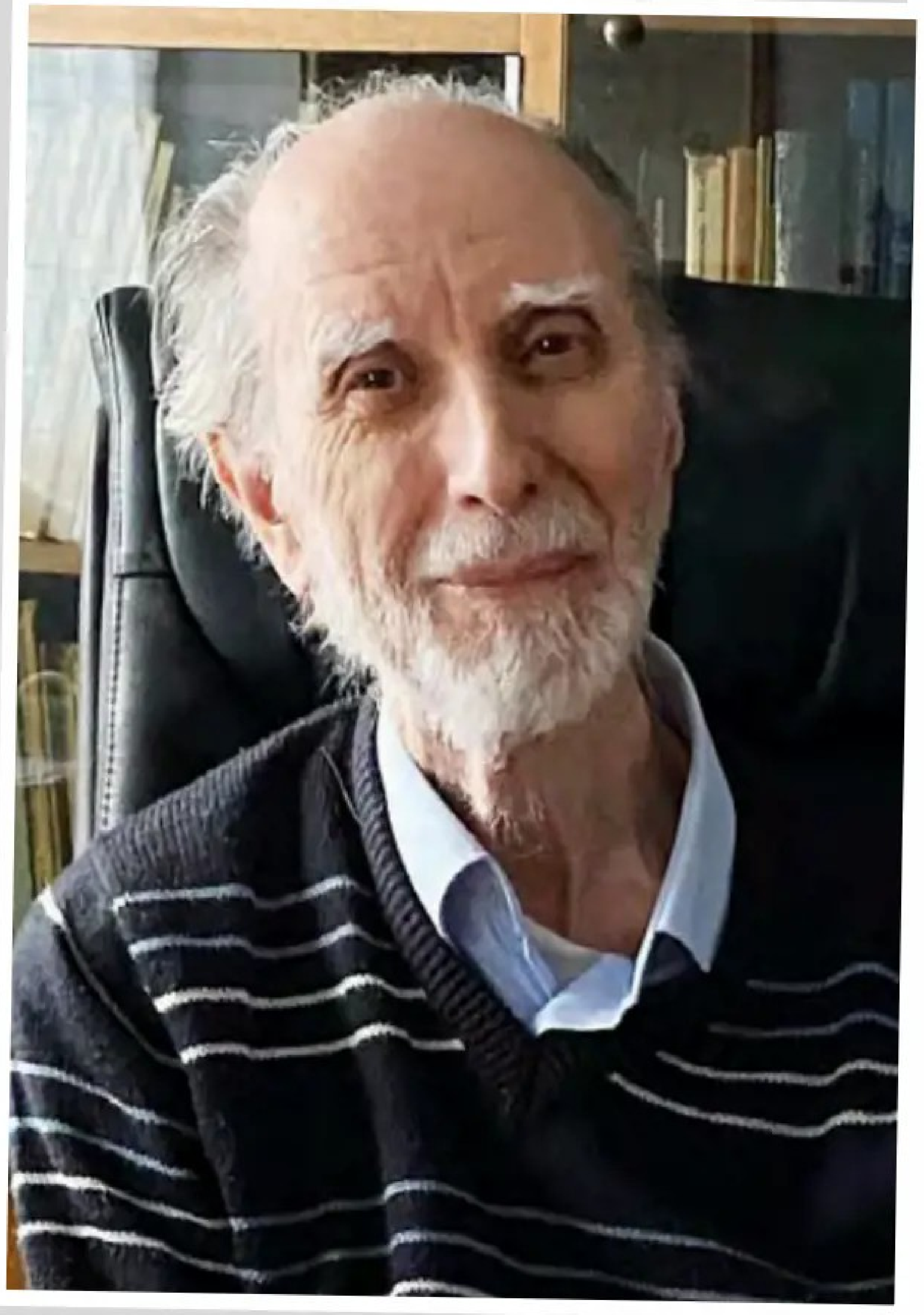
On the subject of special markings on Royal Australian Air Force Caribou, A4-299 was not the only one to have them. When the Australian Caribou contingent was withdrawn from Port Moresby after Papua New Guinea achieved independence in September 1975, A4-231 had *Balus em go pinis* and A4-228 *Dispela igo pinis olsem* on their respective noses. If my somewhat hazy recollection of Melanesian Tok Pisin is correct, the first says, "The aircraft is going away for good" and the second, "This one is going away for good as well". Both aircraft were from No 38 Squadron, and were photographed on 20 December 1975, the day before they departed.

I think the tragic 1972 crash had quite an effect on both the national and expatriate communities, and when we arrived in the country in 1975 I remember speaking to someone whose brother had been killed in the accident.

RAAF Caribou also participated in the activities to mark independence, as two took part in the flypast at the flag-raising ceremony in Port Moresby on 16 September in formation with (I guess) the first PNG Defence Force C-47, along with the MB326s



Our reader's wish is our command: another Felixstowe F2A at Kalafrana, this time the very colourful N4490.



of the RAAF Roulettes aerobatic team and three RAAF Canberras.
Stephen Thair

I was pleasantly surprised with Paul Phillips' Personal Album photos of RAF Kalafrana in 1922 (*Aeroplane* June 2024). My parents' balcony apartment from 1945-54 was just 3km from this base and the south slipway on which the Felixstowe F2As are shown parked.

Kalafrana was transferred to the Fleet Air Arm in April 1946 to become the Royal Navy Aircraft Maintenance Yard (RNAMY). FAA aircraft would be brought ashore here, wings folded, on flat barges/lighters from RN carriers anchored in Marsaxlokk Bay. It was a time of new FAA types entering service, and which also landed at the adjacent HMS *Falcon* airfield at Hal Far (aircraft code HF). Of closer interest were the long, low-slung Queen Mary aircraft transports, negotiating the narrow streets conveying neatly stacked FAA airframe wrecks from the RNAMY or HMS *Falcon* to Grand Harbour for onward return to the UK.

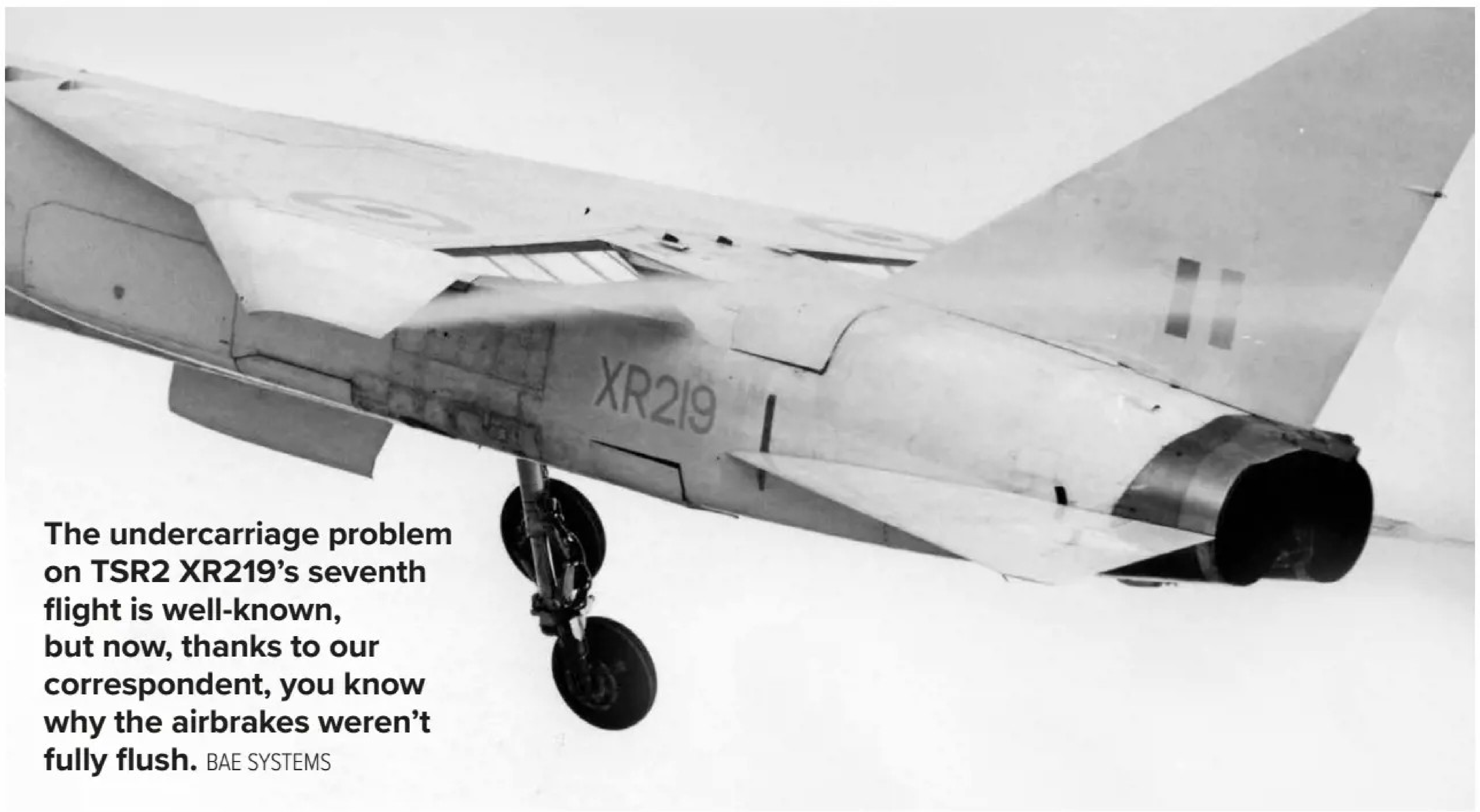
The F2A pictured on page 103 is N4089 *Neptune* of No 267 Squadron. The strange colour schemes on the F2As are most intriguing. Are there sources for these liveries? I would love to see more photos of Kalafrana from Mr Phillips.
Joe Vella

Whenever I see an article on the TSR2 in *Aeroplane* it always reminds me of the days when I was working at H. M. Hobson, because we produced most of the powered flying controls for the aircraft. In particular I, as a 24-year-old stress engineer, remember my boss coming to me one day to say the aircraft had to fly with its airbrake doors slightly ajar because of a thermal expansion problem with the control mechanism, and would I sort it out, please?

The airbrakes were opened by four massive ball screw jacks, all interconnected to a spool valve control on a hydraulic motor. The very long control arm was situated between the engines such that when set flush at ambient temperature it was in one position; then, as it heated up during engine operation, it tended to over-close the doors and buckle the rear airframe. Hence the quick initial solution to fit and fly with the doors ajar.

The long aluminium control arm was clearly the problem, but its replacement with a non-expanding material of the same weight was more difficult. I eventually overcame the problem and later flights were achieved with the doors flush.

A photo on the wall of our design office neatly summed it all up: "Never in the field of control design had so much been earned by so few for so little effort."
Alan Howarth



The undercarriage problem on TSR2 XR219's seventh flight is well-known, but now, thanks to our correspondent, you know why the airbrakes weren't fully flush. BAE SYSTEMS

A sad message to inform you of the death at 94 years of age of Giorgio Apostolo, the undisputed dean of Italian aviation historians, whose researches and studies have for decades been the deepest and most accurate sources on the history of aeronautics in Italy. Author and publisher of innumerable books and studies, he is best remembered for *Aerofan*, the quarterly magazine that for 25 years was the reference publication and treasure-trove for any researcher and enthusiast in our world. His international connections also brought him into contact with the international aviation scene, and in particular he was an ardent admirer of your magazine, which he frequently cited as an example to follow.
Giulio Valdonio

Aeroplane *sends its condolences to the family and friends of Signor Apostolo — Ed.*

The editor reserves the right to edit all letters. Please include your full name and address in correspondence.

Q&A

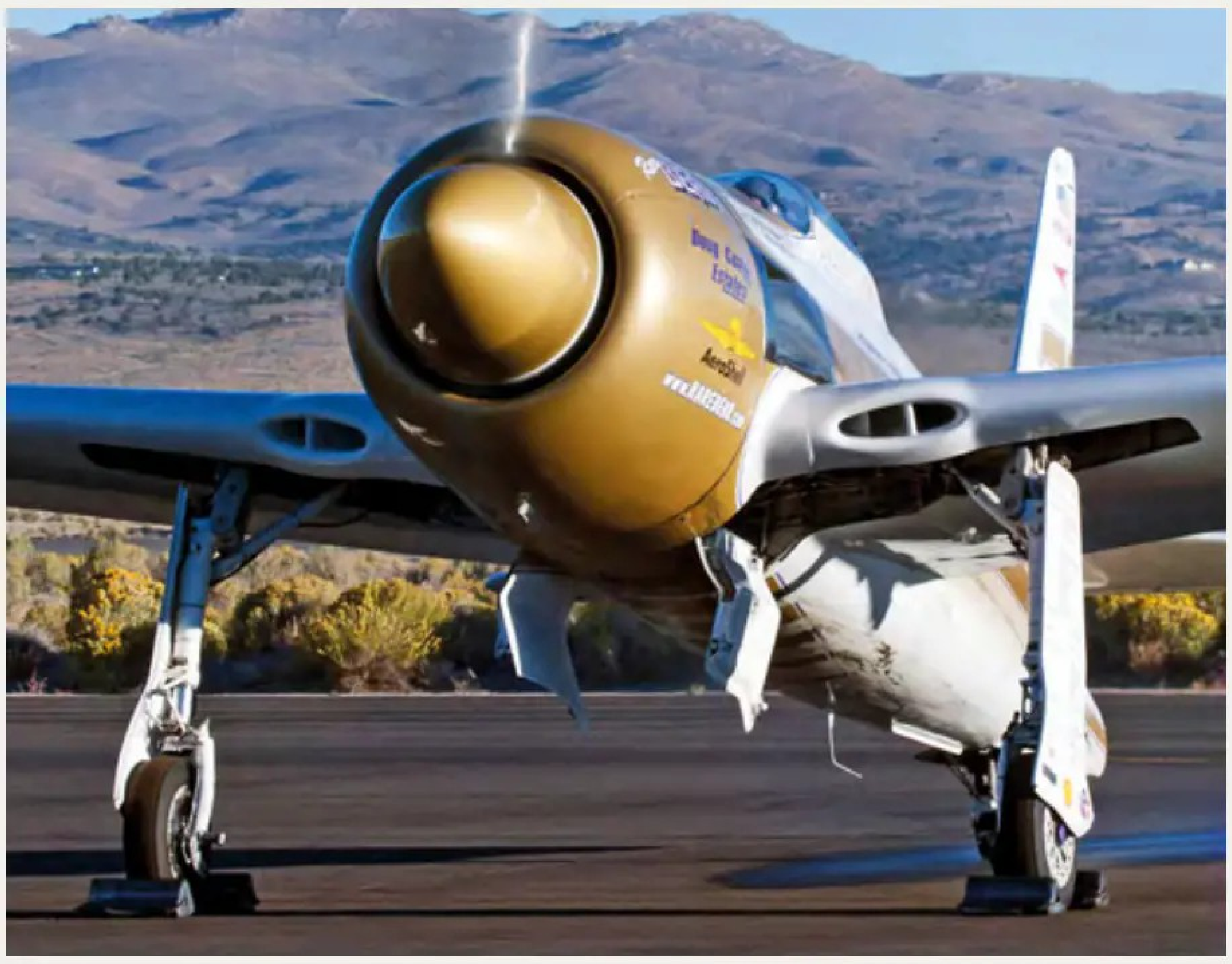
COMPILER: BARRY WHEELER

WRITE TO: *Aeroplane*, Key Publishing Ltd,
PO Box 100, Stamford, Lincolnshire PE9 1XQ, UK

E-MAIL TO: aeroplane@keypublishing.com,
putting 'Q&A' in the header

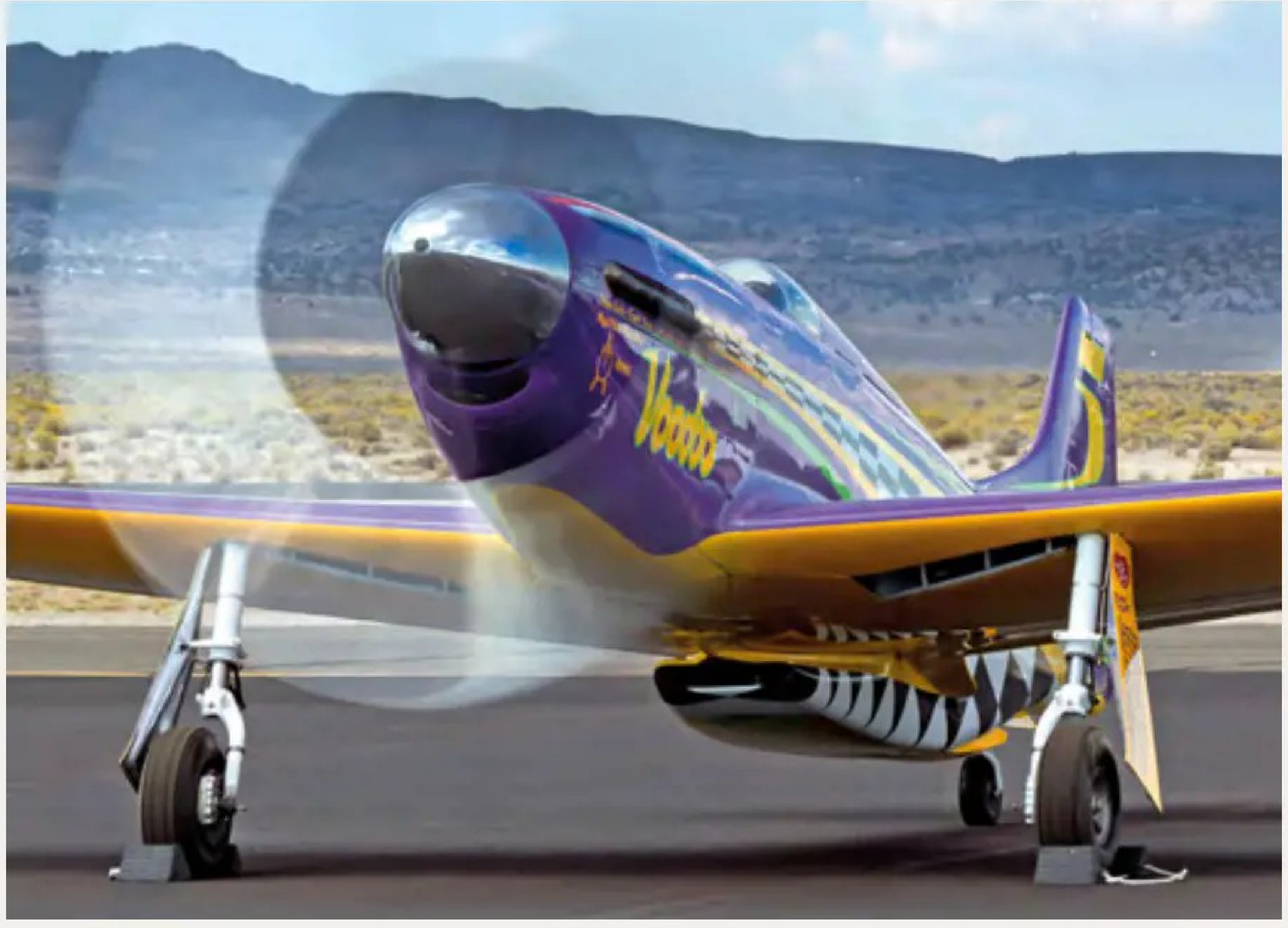
Are you seeking the answer to a thorny aviation question, or trying to trace an old aviation friend? Our 'questions and answers' page might help

THIS MONTH'S QUESTIONS



In-line or radial?

Q Nicholas Fitton poses a question regarding performance comparison between the in-line Rolls-Royce Merlin and Griffon engines and the large radial powerplants with their greater frontal areas: why do the outright speeds of fighters so equipped appear to be similar? He says, "I would have thought the 'slimline' engines would have much lower drag and as such, power for power, be faster. Cooling air entering a radial would slow down and raise the air pressure and thus reduce the speed. Did the heat rejection — which must have been considerable — into this high-pressure air confer some 'Meredith' thrust from the outlet gills, or at least net zero drag?" Nick adds the example of the record speeds for F8F Bearcat *Rare Bear* and P-51 Mustang *Voodoo* of 528 and 531mph respectively.



Bearcat *Rare Bear* (top) and Mustang *Voodoo* run up their respective engines, giving an opportunity to compare frontal areas. ALAMY

Spitfire elevators

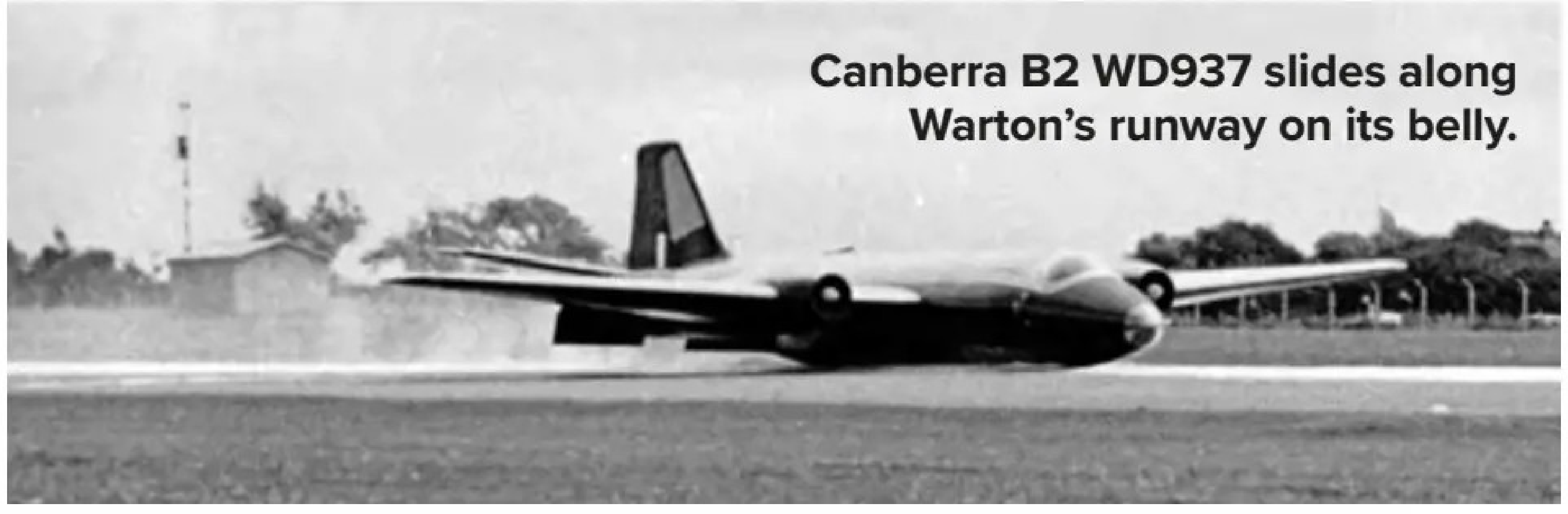
Q Barrie Purslow is trying to find out why, in almost every photograph of airborne Spitfires flying straight and level, the elevator appears to be a few degrees down from the neutral position. The balance tab should match the profile of the recess in the tailplane but, invariably, it doesn't. He has sought an explanation from several enthusiasts and colleagues, but nobody can supply a suitable answer. Can readers help?

Private Hudson at Kenley

Q Your compiler was looking through the RAF Kenley operations record book and discovered a brief mention of a short visit by a privately flown Lockheed Hudson on 19 January 1946. It was diverted to the airfield due to fog in the London area. With no mention of a registration or serial number, could anyone supply these details and whether it was based in the UK or visiting?

THIS MONTH'S ANSWERS

Canberra accident



Canberra B2 WD937 slides along Warton's runway on its belly.

Q Jonathan Waite recalled in the March issue the landing accident suffered by Canberra WD937 and asked if anyone could add detail to the sparse information he has.

A Jeremy Downs responded with details found in *English Electric Canberra* by Roland Beamont and Arthur Reed, published by Ian Allan in 1984. WD937 was from the first production batch of B2s and operated at Warton between 1952 and 1968. The incident Jonathan Waite refers to involved an undercarriage malfunction when the aircraft was being flown by production test pilot Keith Isherwood. The date was not recorded, but Isherwood extended the flight to burn off fuel and allow the runway to be foamed before the wheels-up landing, which was successfully accomplished, so much so that the aircraft was flying again in less than a week. The cause of the malfunction was found to be a maintenance error.

Concorde registration

Q In the March issue, Ray Sellers asked if anyone could provide the registration of the Concorde he flew on to New York as a passenger aboard BA 003 on 12 September 1988.

A From the Heritage Concorde website, John Anderson says flight BA 003 on that date was flown by G-BOAC, which is now displayed at Manchester Airport.

THE MOST IMMERSIVE VEHICULAR COMBAT EXPERIENCE

WAR THUNDER

2500+ PLAYABLE VEHICLES | 100+ LARGE-SCALE MAPS | INTENSE PVP & PVE ACTION

GET YOUR BONUS

WARTHUNDER.COM

Windows STEAM Mac oculus VIVE

PS4 XBOX ONE PS5 XBOX SERIES X|S

Gaijin Entertainment

© 2009—2018 by Gaijin Entertainment. All rights reserved.

12

www.pegi.info

SUBSCRIBE TODAY & RECEIVE A **FREE GIFT***

AEROPLANE
TSR2
THE FINAL RECK
AEROPLANE
VULCAN
Creating the legend
What made the delta such a winning design?

SUBSCRIBER BENEFITS

- **SAVE** over buying individual issues
- **DELIVERED DIRECT** to your door
- **SUBSCRIBER DISCOUNTS** on the Key Publishing Shop
- **BE THE FIRST** to read the latest features

OUR LATEST SUBSCRIPTION OFFERS

BEST VALUE

UK PRINT

1 YEAR

£59.99

Paying by Annual Direct Debit

GET TWO ISSUES FREE!

UK PRINT

6 MONTHS

£32.99

Paying by Credit or Debit Card

SAVE 50p PER ISSUE!

Please quote: **AM0425** when ordering

SCAN THE QR CODE TO ORDER DIRECT FROM OUR SHOP

shop.keypublishing.com/amsubs

or call **+44 (0)1780 480404** (Lines open 9.00-5.30, Monday-Friday GMT)

Terms and conditions: Quoted rates are for UK subscriptions only, paying one year print or annual direct debit. Standard one-year print subscription prices: UK - £65.99, EU - £71.99, USA - £83.99, ROW - £89.99. All quoted prices subject to change. *Free gifts only available on subscriptions paying by UK Print 1-Year £65.99, for full information please see the website. **CLOSING DATE: 30th April 2025**

SPECIAL SECTION

TEST FLYING'S GOLDEN AGE
GREAT AIRCRAFT • LEGENDARY PILOTS

March 2025
Issue No 623,
Vol 53, No 3

AEROPLANE

HISTORY IN THE AIR SINCE 1911

WARBIRD MAGIC

IN-DEPTH INTERVIEW

'Black Knight' to Blenheim and beyond: John Romain's life with historic aircraft

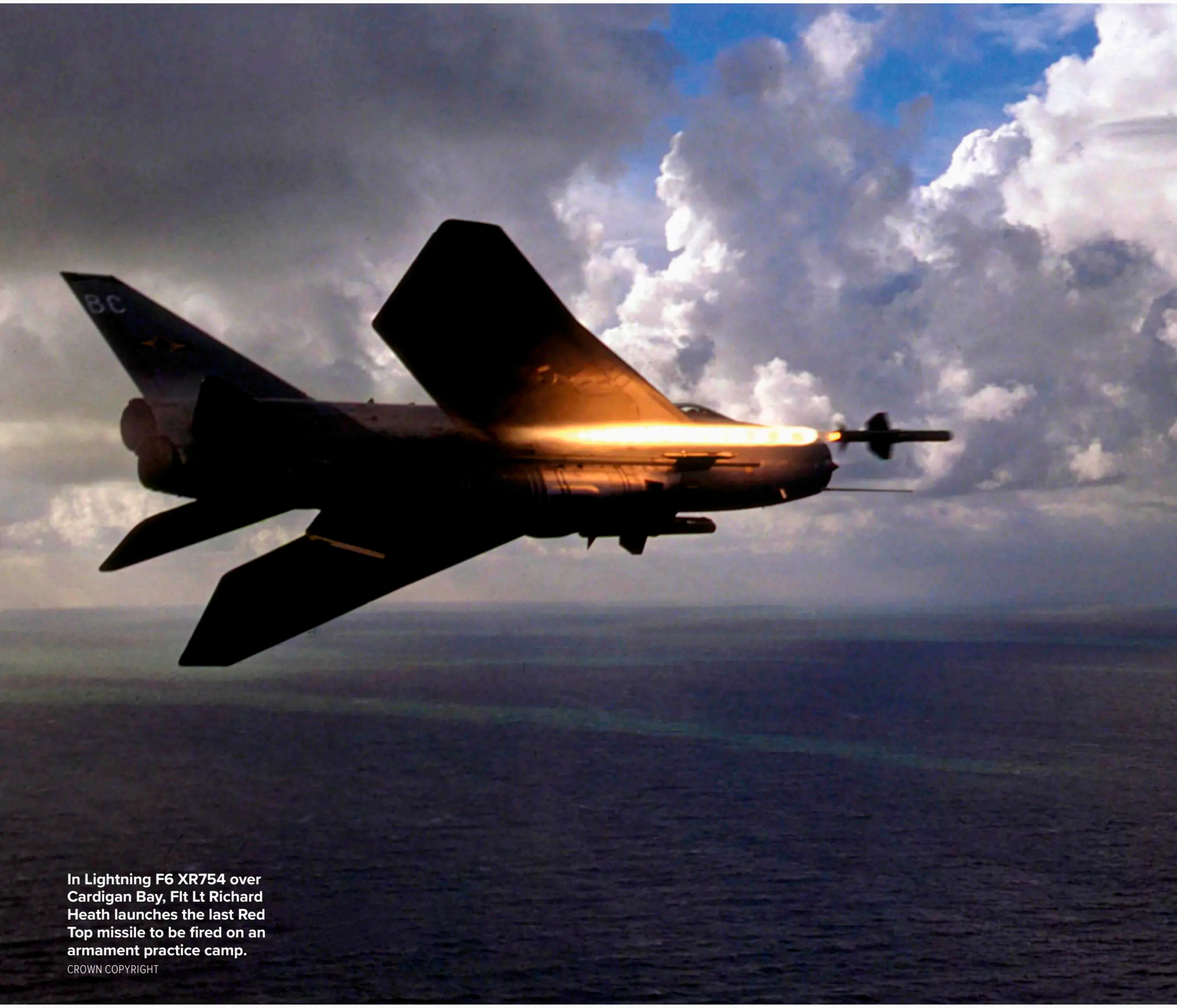
Avr

COAS

Makin

SUBSCRIBE TODAY & GET TWO ISSUES FREE!

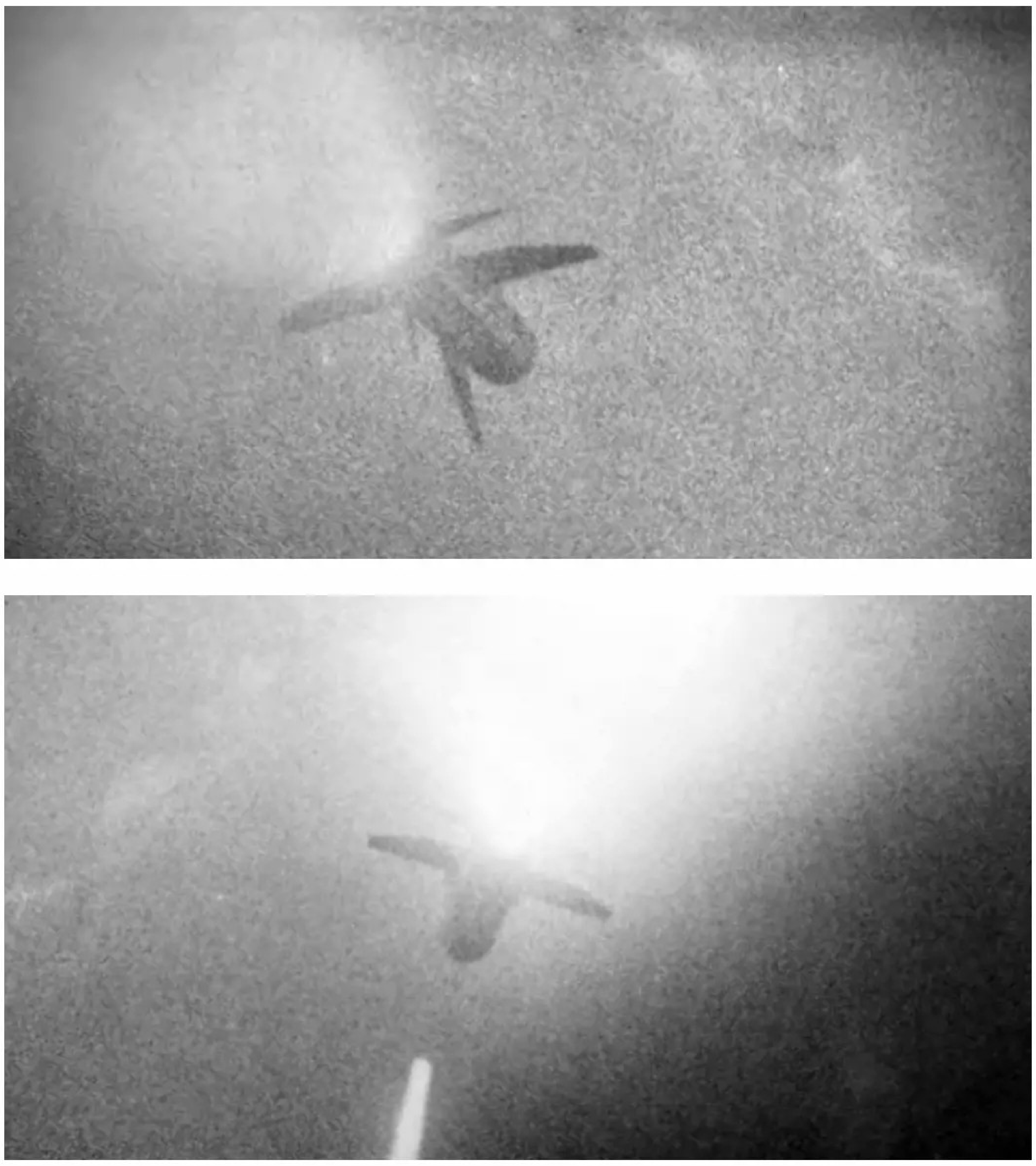
330/25



In Lightning F6 XR754 over Cardigan Bay, Flt Lt Richard Heath launches the last Red Top missile to be fired on an armament practice camp.
CROWN COPYRIGHT

RED ALERT

In making the English Electric Lightning a truly effective fighter, having an air-to-air missile able to tackle the latest Soviet bombers head-on was a crucial step forward. It came in the form of Red Top — but, thankfully, it was never destined for use 'in anger'. One of the last RAF Lightning pilots describes his rare opportunity to fire this important weapon **WORDS:** IAN BLACK



LEFT:
The Lightning didn't possess any sophisticated recording systems, relying solely on the small black-and-white cine camera mounted in the nose. At trigger press the camera ran and captured the missile as it sped towards its target. Due to the poor quality the only usable film was as the weapon passed the radome. With the target between one and two miles away, there was no record of the actual impact.
VIA IAN BLACK

It's 10.30am and I've been sat on alert for two hours, the monotonous tone of the 'squawk box' beeping every few seconds to let us know we still have two-way contact with Boulmer, our sector operations centre. We checked in during the handover and were told it was "all quiet on the western front" — no sign of any Soviet activity. I've signed for my aeroplane and Bob, the squadron weapons officer, has authorised our duty. He's Q2 today and I'm Q1. Our allocated aircraft are Lightning F6s XS919 and XS923. We are both live-armed with 120 rounds of 30mm tracer bullets and two ready-to-use Red Tops. The weather for February is surprisingly good, Binbrook being notorious for its poor conditions, being perched high in the Lincolnshire Wolds. And the Lightning is approaching the twilight of its long career. There are to be no more reprieves and the end is now firmly in sight — we are due to down-declare to NATO on 27 April 1988, in less than two months' time.

I'm walking to the kitchen to make a brew when the banshee wail of the klaxon breaks the air. A quick about-turn and I run for my aircraft while donning my exposure suit. At the foot of the ladder, my trusty Mae West lifejacket awaits, and I grab it while climbing up to the cockpit at breakneck speed. My aircraft is 'cocked'; I completed all the standard checks two hours before and all I have to do is strap in. Like a Formula One team on steroids, while I do so my groundcrew are removing ground locks and safety caps from the missiles and starting the external ground power. Could this be my chance to see a Soviet bomber in the flesh?

Our Lightning is connected by telebrief, a secure landline direct to Boulmer. I check in first: "Boulmer, Q1 is cockpit-ready". It's 45 seconds since the hooter sounded. "Roger, southern QRA, two aircraft. Your mission: live missile-firing profile AP50, climb angels 25, vector 270". "Roger, Boulmer. Q1 scramble acknowledged."

I signal to my groundcrew with a single rotating finger that I'm starting the number one engine. They give me the thumbs-up, and I simultaneously raise the gang bar — allowing all the fuel pumps to come online — and open the left throttle, putting the high-pressure fuel cock on. A millisecond later I press the number one start button, which starts an irreversible sequence of events. Volatile mono-combustible Avpin is drawn from the spine tank and fed to the hungry Plessey starter unit. With an enormous whoosh the starter turns the number one Avon, and the temperature starts to rise in parallel with the rpm. As soon as I'm happy I do the same for the number two engine, and within a minute I wave the chocks away, lower the canopy and tell ATC I'm taxiing. Two minutes have passed.

Canopy down and locked, parking brake off, the aircraft is held straight in its guide rail to avoid clipping a wing on the hangar door and I'm pretty much lined up on the runway, just 25 yards away. ATC clear me for take-off and I know with a live scramble everyone — and I mean everyone

— has been told to stay clear. We have priority.

I push both throttles forward. Fully armed and fully fuelled, even the Lightning is sluggish. Hitting the end stop I rock the throttles into reheat and feel a kick in my back. Both 'burners are lit, my speed is passing 100kt and I'm looking to rotate in a few seconds. Airborne, gear up, I make a sharp left turn to climb up into the airway, heading for RAF Valley and then into the range. Changing frequency, I can hear my number two is airborne and I throttle back to let him come alongside.

As we level off, I reach down for my green, secret 'Noddy guide,' the pilots' guide to how to fly a Lightning. AP50 is the code for a live missile firing and I work out I'm scheduled to perform a low-level stern shot on a target at 100ft and 300kt. Flying west, I start a slow descent towards Valley and D201, the range in Cardigan Bay, for the culmination of three years' training. We take up our holding position at Bardsey Island just off the Llŷn peninsular; by now I have a mental map of the UK and have no trouble finding it. I have to run through my pre-attack checks — I've fired one missile from a Lightning before, a Firestreak, and in a previous life I fired a Sparrow III and a Skyflash. To get the chance to fire a Red Top is welcome but the stress of making a mistake is at the top of my mind. Aircrew who screw up missile firings generally never live it down, so it's 'big match' stuff.

> ***"A bright flash is obscured by smoke as the warhead detonates"***

My radar is on and working well; I've tested the G90 camera, the small black-and-white cine recorder that sits below the radar in the intake, and now I need to arm the missile. I select the master armament switch to GW (guided weapon) and the 'arm safe' switch to 'arm.' A vital check with Red Top is to check the pure air gauge drops and then returns to show the missile seeker head is being cooled. I look down at the weapon arming panel and start my stopwatch. In two minutes, both missiles should be armed. Now I select 'singles' — this means if I squeeze the trigger only one missile will come off. With two live missiles fitted I can't run the risk of accidentally firing a second.

My pre-attack checks complete, I'm in good shape and get handed off to Aberporth who start to guide me to my target. I'm looking for

RIGHT: The author with a Red Top-equipped, camouflaged Lightning T5.
VIA IAN BLACK

BELOW: XR754 carries a live Red Top — identified by the yellow bands on the missile — prior to a launch off the Welsh coast.
IAN BLACK

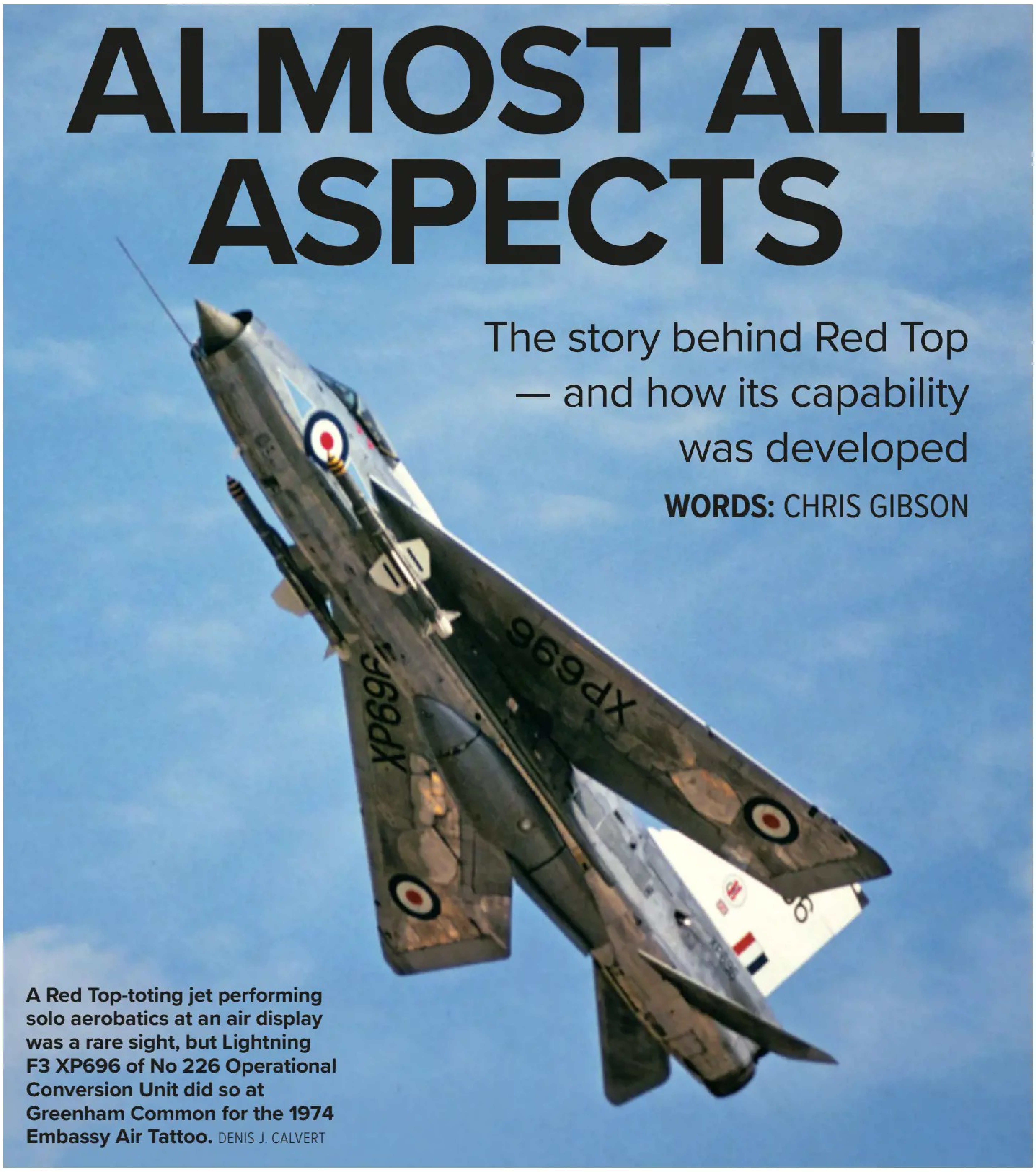
a small, unmanned Jindivik drone. Aberporth do a great job and soon I’m down at 250ft and 420kt, five miles behind the target. I coax my radar into searching for this miniscule machine and pick it up four miles on the nose. I let Aberporth know; as I get close to two miles they call, “Punch clear to fire”. Spotting my target, they tell me, “Flares lit”.

I can see the tiny glow trailing on a wire behind the Jindivik and my missile instantly acquires the heat source. I wait a second, make the safe/arm switch on my trigger live and call, “Firing, firing, now”. On the “now” I squeeze the trigger. After what seems like an eternity but is actually a fraction of a second there is an enormous ‘whoosh’, and the right-hand side of the aircraft is covered in smoke. As my missile leaves the rail, I ensure my camera is on and start to break away, up and left. At 2,000ft, I roll my Lightning onto its back to watch the show. Just below me I witness the Red Top hitting the flare and a bright flash being obscured by thick, black smoke as the warhead detonates. Seconds later I see what is like an electric snake hitting the water as the expanding rod falls harmlessly into the sea.

The whole event has taken less than 45 minutes. I now carry out my post-attack checks and make for Valley one missile lighter. After just over 25 years, the RAF’s association with the Red Top missile is over.

Applying the parking brake on XS919, I have time for a moment’s reflection. It’s 25 February 1988, and just 24 years ago my father was introducing this highly classified missile into service with No 11 Squadron’s Lightnings. Now I had closed the chapter — a fitting end to the RAF’s first head-on air-to-air missile. But there is a postscript. Having assumed mine was the last live Red Top shot, the honour actually went to Fg Off Derek ‘Grinner’ Smith, who was launched from QRA with hours to go before down-declaring and fired off a pair of Red Tops from XS903. That aircraft is now preserved with the wonderful Yorkshire Air Museum at Elvington.

ALMOST ALL ASPECTS



The story behind Red Top — and how its capability was developed

WORDS: CHRIS GIBSON

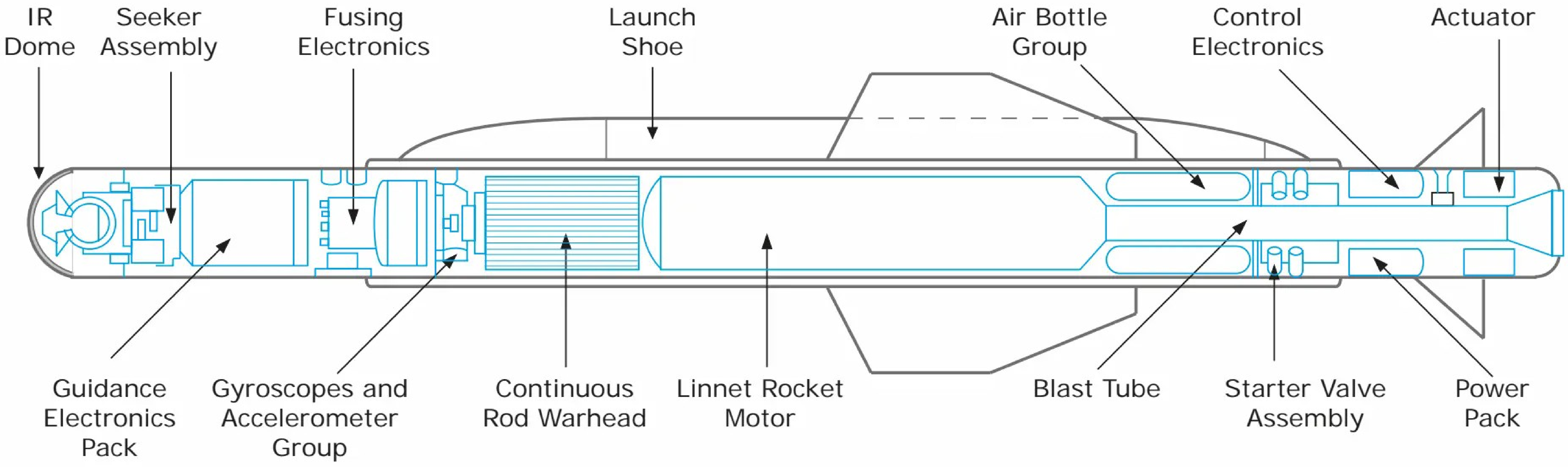
A Red Top-toting jet performing solo aerobatics at an air display was a rare sight, but Lightning F3 XP696 of No 226 Operational Conversion Unit did so at Greenham Common for the 1974 Embassy Air Tattoo. DENIS J. CALVERT

“Almost all-round attack”. The title comes from paragraph two of the Air Staff’s operational requirement OR1117, specifically its fourth issue, and Admiralty requirement AW274, issued on 25 July 1958. Those four words sum up the innovation and lethality of Red Top, a key element of Britain’s Cold War armoury. Yet despite its 25 years of service with three air forces and the Fleet Air Arm, like most of Britain’s Cold War weapons, Red Top was never fired in anger.

Published in 1949, issue one of specification F23/49 called for a fighter to intercept Soviet bombers approaching the UK across the North Sea. Armed with 30mm ADEN cannon and a pair of de Havilland Propellers Blue Jay Mk1 infra-red-seeking air-to-air missiles, the resulting English Electric Lightning was to reach a firing position behind the bombers before they dropped their nuclear weapons.

The Blue Jay Mk1 came into use as the Firestreak on the Gloster Javelin in 1957, followed by the de Havilland Sea Vixen in 1958, and armed the Lightning when it entered service with No 74 Squadron in 1960. But while the Firestreak was more than capable of dealing with Tupolev’s Tu-4 ‘Bull’, Tu-95 ‘Bear’ and Tu-16 ‘Badger’, the next generation of Soviet bombers was a very different matter.

Prior to the advent of the Lightning, western intelligence agencies had briefed that the Soviets were developing supersonic bombers. The Tupolev Tu-22 ‘Blinder’ and the Myasishchev M-50/M-52 ‘Bounder’ would be armed with stand-off weapons and were thus of great concern to the Air Staff. Such developments in the Soviet threat had been anticipated, hence requirements for interceptors (OR329) and missiles (OR1105 with radar guidance and OR1131 with IR guidance) to tackle these new bombers well before they could release their weapons. The requirements boiled down to the interceptor having sufficient performance to reach the incoming bombers well out over the North Sea, armed with AAMs that could tackle approaching targets.



When examining Red Top's innards, its logical arrangement of components and use of new technology show the great strides made by de Havilland since designing the Firestreak. The new seeker, change to an integrated rocket motor and use of 'canned electronics' were key to Red Top's success. CHRIS GIBSON

In the 1950s and early 1960s the AAMs used for such interceptions were described as having a 'collision course' capability, but are now better-known as 'all-aspect'. A universal feature of modern IR AAMs, as of the late 1950s all-aspect was cutting-edge technology requiring radar guidance or advanced IR seekers.

The 1957 Defence White Paper, known as the Sandys Review, cancelled the interceptors to meet OR329, along with the AAMs to have armed them. Sandys favoured ground-launched missiles: the de Havilland Blue Streak ballistic missiles to carry the deterrent and the Bristol Bloodhound to protect their silos in East Anglia. However, SAMs would take time to develop, especially the more capable, longer-ranged Bloodhound Mk2 which left a capability gap.

The Air Staff understood the new Soviet supersonic bombers would be across the 'bomb release line' off Britain's east coast before Lightnings armed with the rear-aspect Firestreak could manoeuvre into a firing position, a 15° cone behind the target. Only a weapon that could tackle targets almost head-on would be viable and would require radar guidance or a new generation of IR weapon, but these had just been cancelled.

Blue Jay Mk4, known as Blue Vesta and capable of collision course interceptions, had been under development for the OR329 interceptors, but when these were canned the RAF was left to soldier on with the Lightning and its cannon/Firestreak tailchase armament. Mr W. R. B. Hynd of the Royal Aircraft Establishment asserted on 26 November 1956 that Blue Jay Mk4 was a "considerably more attractive missile than earlier versions", but that did not stop Sandys cancelling it in April 1957.

The Air Staff soon pointed out that until the Bloodhound Mk2 entered service, the Tu-22 'Blinder' would still be a substantial threat if RAF and FAA interceptors lacked collision-course weapons. This is the point where the political development of the missile that became Red Top begins. Sandys addressed the capability gap by sanctioning development of a collision-course weapon, applying work carried out for Blue Jay Mk4.

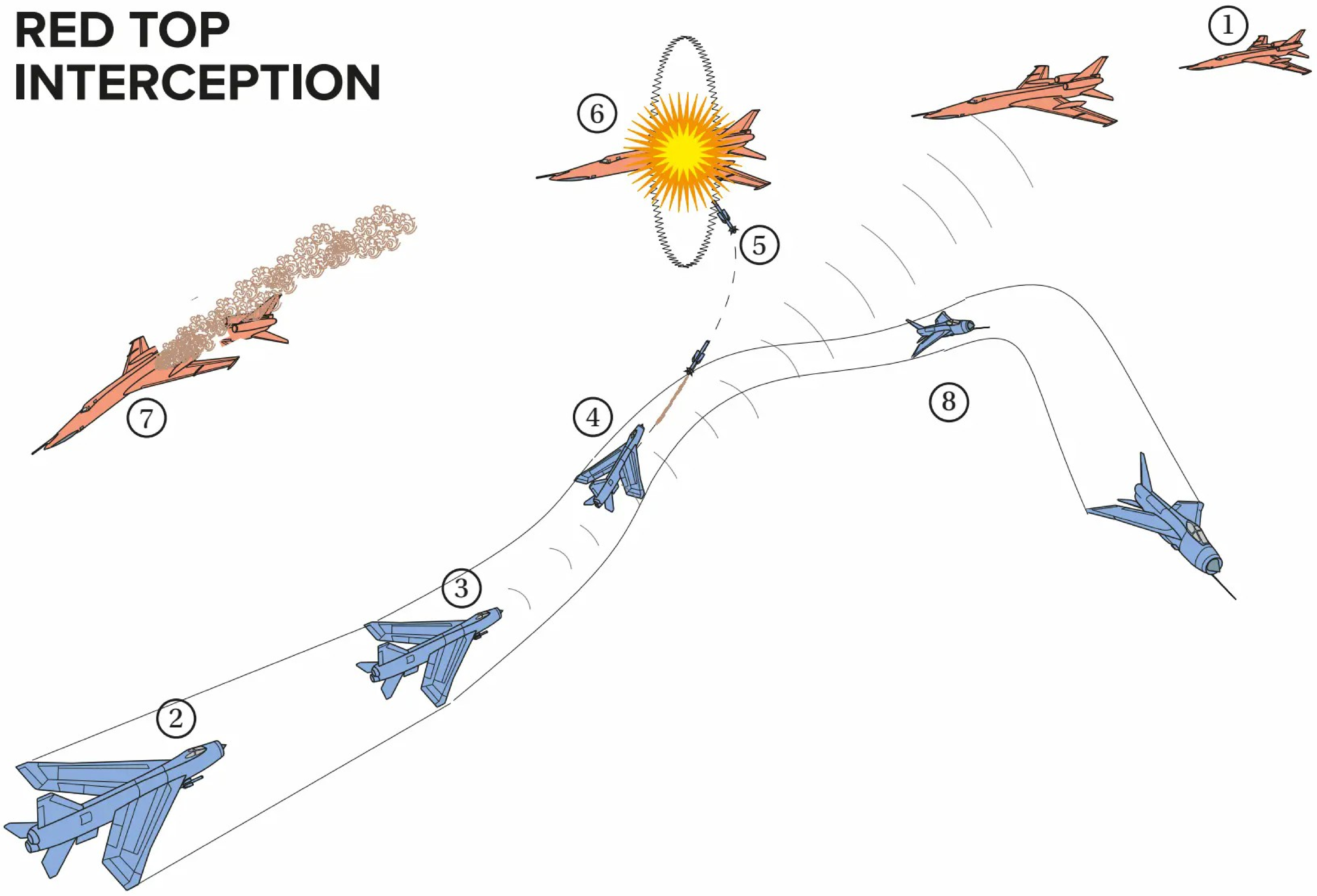
Even before the Sandys paper and Firestreak's service entry, de Havilland had worked on a pair of variants. These were to arm the various mixed-powerplant interceptors that were all the rage in the mid-1950s, such as the Saunders-Roe SR177 designed to meet OR377. Blue Jay Mk2 featured a more powerful Magpie II rocket motor and an improved lead telluride (PbTe) seeker, while the Mk3 had increased wing area and a reduced-thrust motor to reduce the effects of kinetic heating when launched from a Mach 2-plus aircraft at high altitude.

From documents held at the National Archives, the start point for technical development of Red Top can be pinpointed to January 1956. Ray Creasey, chief aerodynamicist at English Electric, was working on the P8, EE's proposal for OR329, to be armed with a pair of Blue Jay Mk4s. This missile included so many changes from the original Blue Jay it required a new codename: Blue Vesta.

Those changes were intended to allow the weapon to arm

BELOW: English Electric Canberras were used extensively for Red Top development. PR9 XH132 was converted by Shorts as the SC9 for Red Top work, with an AI23 radar in the nose cone and a Violet Banner seeker in the under-nose fairing. BOMBARDIER AEROSPACE

RED TOP INTERCEPTION



1. Approaching Tu-22 'Blinder' detected by early warning radar

2. Lightning directed onto 'Blinder' by fighter controllers at the radar station

3. Lightning's Airpass/AI23 radar acquires 'Blinder'; Red Top's IR seeker slaved to radar and locks onto target

4. Lightning launches Red Top, which follows a collision course to the target

5. Guided by Violet Banner seeker, Red Top homes in on heat from 'Blinder' airframe

6. Continuous-rod warhead triggered by Green Garland infra-red fuse

7. Continuous-rod 'hoop' cuts through the airframe, destroying the aircraft

8. Lightning, under ground control, turns away to the next target.

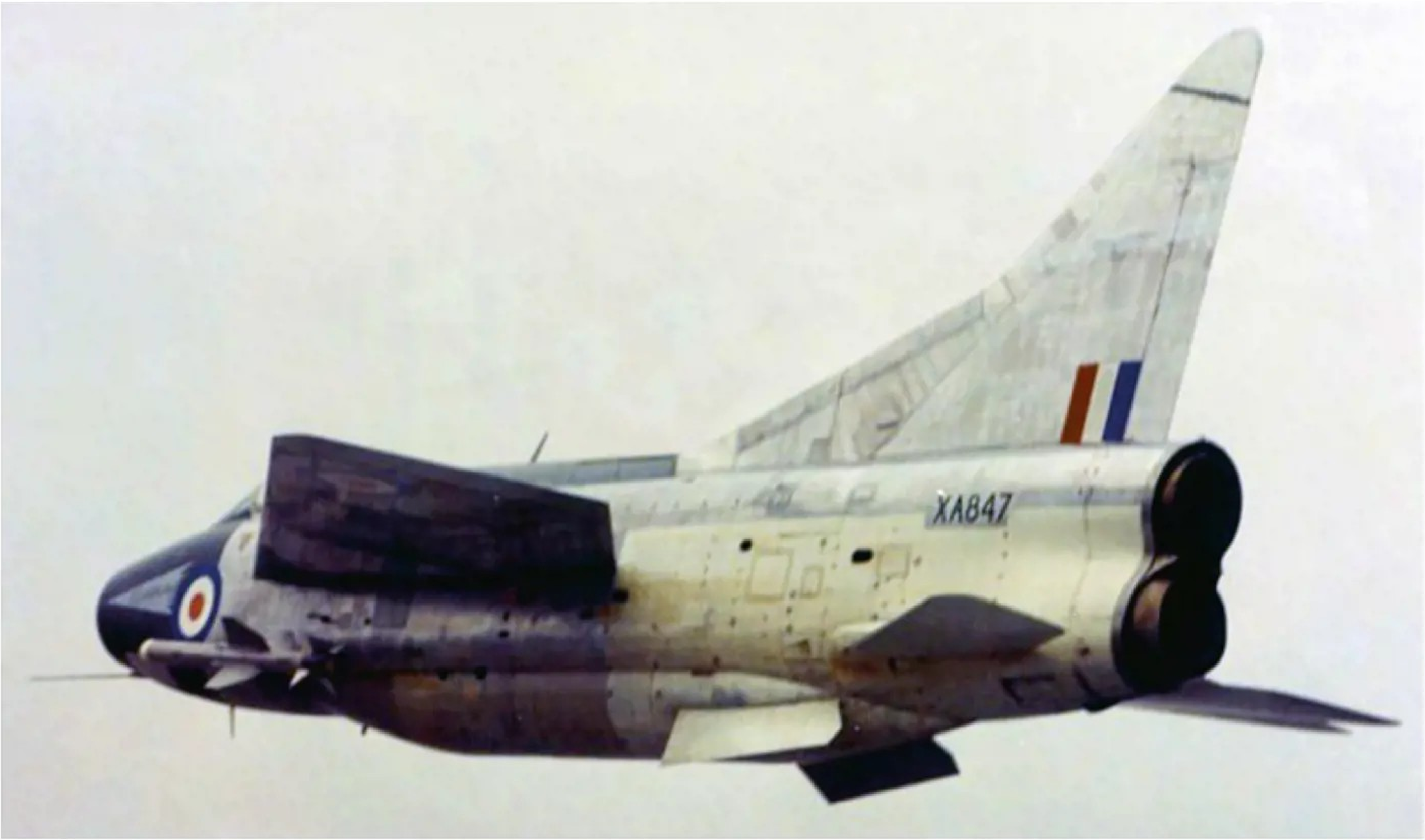
CHRIS GIBSON

a supersonic interceptor and included a continuous-rod warhead, larger, solid steel wings with cut-back 'Mach tips' and swept tailplanes. Significantly, Blue Vesta also featured a new IR seeker with a wider field of view. All this increased the missile's weight from the 300lb (136kg) of Blue Jay Mk1/Firestreak to 425lb (193kg). However, while weight gain is a concern for aircraft developers, it wasn't Blue Vesta's weight that worried Creasey, but its lack of accuracy. Test-firings had shown that even at the short ranges involved in ground trials, Blue Vesta had a miss distance of 20ft (6m). This would no doubt increase at operational ranges and would render the warhead, even a continuous-rod type, less effective.

In a meeting with L. G. Evans and S. V. H. Harding from de Havilland Propellers, Creasey asked why the missile's wing size and all-up weight had risen. The DHP men replied that EE's expectations for an IR-guided weapon were far too high and had been overly influenced by American missiles such as the US Air Force's GAR-2 (later AIM-4) Falcon and the US Navy's AIM-9 Sidewinder. English Electric's engineers took the view that these were smaller missiles and, unlike Blue Vesta, they 'hit' the target and did not need the larger 75lb (34kg) warhead. Interestingly the Falcon proved problematic during the Vietnam War when it was fielded as a dogfight weapon, a role for which it was not intended. DHP advised that the Sidewinder warhead was too small to tackle supersonic bombers.

Their discussion ended amicably, with an agreement to draw up a list of items that required further work. The third item was, "To seriously reconsider the size of the weapon, returning to Blue Jay and increasing from that, rather than trying to pair-off [sic] weight from the present design". This was especially relevant because the heavier Blue Vesta had a variant of the Magpie rocket motor used for Blue Jay, resulting in a corresponding reduction in performance. In summary, DHP should pursue a Blue Jay-sized weapon with a similar-sized warhead. To its credit, DHP did exactly that, and by July 1957 had completely redesigned Blue Jay to such an extent that a

BELOW: Early trials of Red Top included carriage on P1B prototype XA847, which was very rarely photographed with the missile mounted. VIA IAN BLACK



new requirement, OR1117 (Issue 4), was drawn up to cover it. A new codename was assigned for security reasons the following November: Red Top.

Blue Jay/Firestreak had been designed in the early 1950s and used early-1950s circuitry and construction techniques. Technology had made huge strides during that decade, driven by weapons development, and AAMs — such as the design that became Red Top — benefited from this. These included using 'canned electronics' with transistorised circuits and powerful, but more compact, actuators installed close to the fins to provide Red Top with improved accuracy over a wide altitude band. It was essentially a completely new design that featured a new seeker, warhead, rocket motor and electronics, all arranged within the airframe to better use the volume freed up by these new systems.

A description of Red Top is best started at the front. The PbTe seeker on the Blue Jay series was cooled to increase its sensitivity. On the Lightning, this required a separate cooling pack that used liquid ammonia, carried in the interchangeable weapons pallet installed in the lower forward fuselage. The sensor employed in Red Top did not use ammonia cooling, and along with this came many innovative changes that provided a significant jump in capability.

Contemporary documents suggest the Violet Banner name for Firestreak's 'homing head' was retained for Red Top or may have been used interchangeably in ministry documents. The differences between the seekers were significant, with Red Top employing more advanced technologies including a newly developed indium antimonide (InSb) sensor and transistorised electronics. The InSb sensor was cheaper, mainly due to its ease of manufacture compared with the PbTe seekers of the Firestreak. One memo between the Ministry of Supply and the Air Staff explained the cost difference being due to less wastage in manufacturing, one in two InSb sensors being 'usable' against only one in 100 for the PbTe sensor.

> ***"Technology had made huge strides and Red Top benefited"***

The new seeker avoided ammonia by using 'pure air' to increase the sensitivity of the InSb sensor. The air was held in a cylinder within the aircraft weapon pack and was charged to a pressure of 4,500psi (310 bar), providing enough air to cool the sensors to -185°C (-300°F) for a stand-by period of 30 minutes on the Lightning's two missiles. Cooling started when the missile was armed and the air liquified to cool the seeker. The weapon's manual stated that the arming and cooling sequence must be initiated "at least 2 minutes before firing is to take place". This posed little problem when bombers are your targets, but was less useful for dogfighting.

While the Red Top's new InSb seeker was less sensitive than the Firestreak's, it did have an increased field of view. A larger collector mirror allowed interception in a rear cone 60° (originally stated as 62°) to the rear of a target aircraft rather than Firestreak's 15°. Thus it could acquire the heat source over a wider arc, especially when slaved to the interceptor's radar.

Of interest is a document dated 20 December 1957 that describes the IR 'homing head', the original British name for a seeker, with an "angle of look of +/-62°, sensitive in the 3.6μ to 5μ band". This sensitivity in the 3.6-5 micrometre range allowed the seeker to detect the jet plume of an aircraft "as well as black body radiation" from the aircraft itself. The seeker also had a better "sun non-effective angle" of +/-5°, which meant the missile could operate without being affected by the IR radiation from the sun. The contemporary Sidewinder's non-effective angle was +/-20°, meaning the Sidewinder was more susceptible

SEA VIXEN AND RED TOP

The de Havilland Sea Vixen entered Fleet Air Arm service in July 1959 as the FAW1, armed with a battery of Microcell 2in rockets and four Firestreaks. During 1964 the FAW1s were succeeded by the upgraded FAW2, capable of carrying four Red Tops. The FAW2 could carry Firestreaks as well, even at the same time, albeit on different wings — for instance, two Red Tops on the port and two Firestreaks on the starboard. The reason was to avoid contamination of the 'pure air' system, which appears to have been 'handed'. Red Top worked best when launched from an aircraft with higher speed, something the Sea Vixen lacked. de Havilland hoped to address this with the more powerful rockets on the Red Top Mk2 and Mk2 Plus.

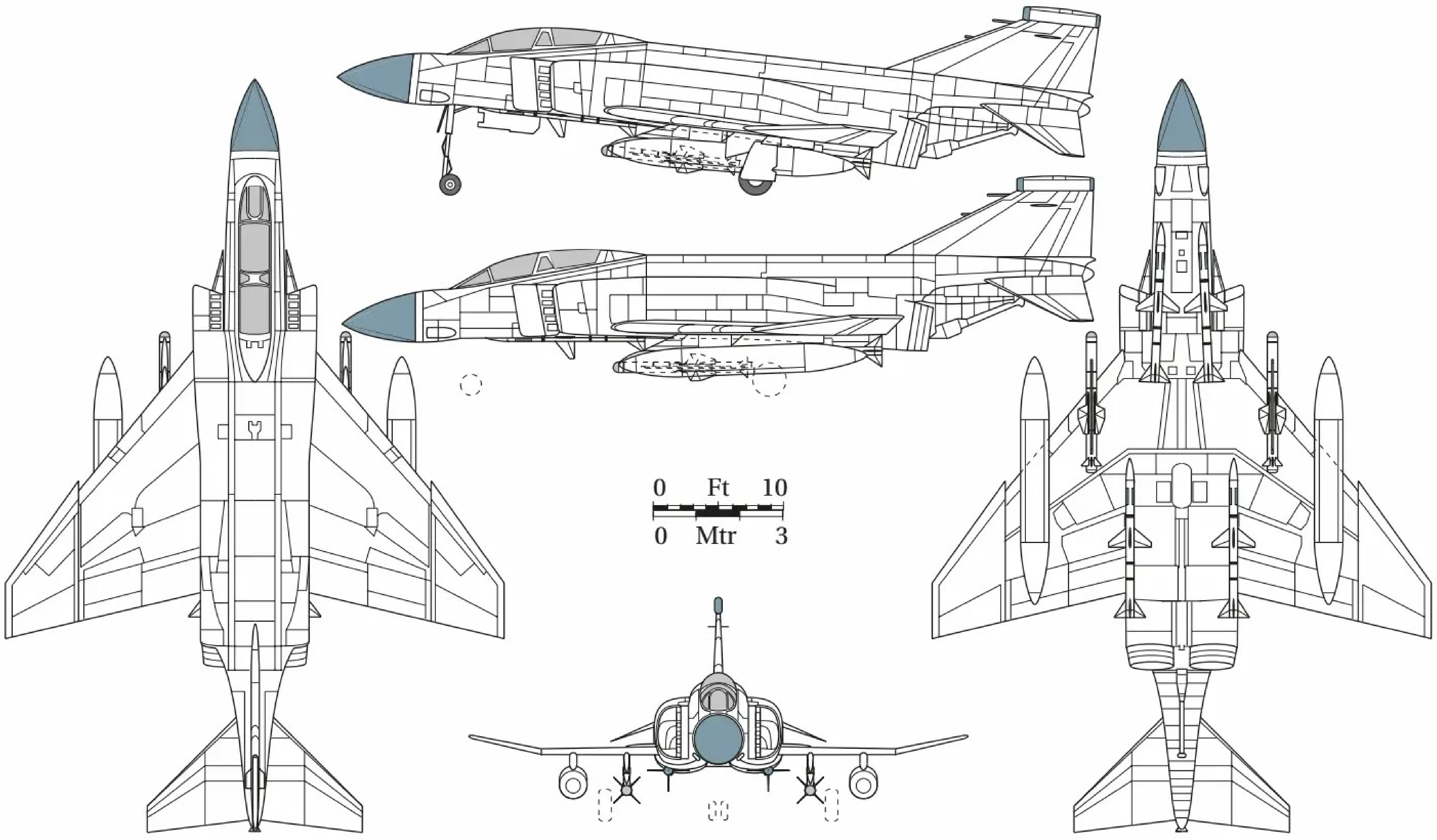
DH technicians load a Red Top onto a Sea Vixen FAW2 in June 1963. KEY COLLECTION to being ‘decoyed’ by the target manoeuvring towards the sun.

The new cooling system for the InSb sensor in Violet Banner reduced the complexity and size of the entire cooling system, not to mention the hazard posed by ammonia to groundcrew. Ammonia was also used to cool the valve-driven electronics fitted in the Firestreak weapons pack, so the change to transistorised electronics and new cooling system on Red Top freed-up space in the Lightning.

Red Tops used for initial trials had their seeker installed behind a Firestreak-style IR-transparent octagonal pyramid made from arsenic trisulphide glass, which is transparent to infra-red light, but this was soon replaced with a hemispherical ‘IR dome’. The rationale for an IR dome was outlined in March 1959 by the Radar Research Establishment’s L. Manns, who explained that it was adopted to provide strength while using the minimum of glass. The dome was less prone to sun reflections than the thicker glass of the pyramid. However, Manns addressed that by saying how vacuum deposited coatings (now standard on camera and binocular lenses) would lessen reflections while filtering out wavelengths between 1.6μ and 3μ, which would hopefully reduce the chance of the seeker being drawn to other light sources.

As well as a new IR sensor, Red Top used two fuse systems, contact and proximity. The former triggered the warhead when one of the wings contacted the target. The new proximity fuse, called Green Garland, viewed the world through two windows on the side of the airframe forward of the wings. The IR sensors were cooled by an Arcton cooling system that began to operate as soon as the Red Top was launched. The proximity fuse system was also cued prior to launch to ensure it detonated the warhead at the critical point in its flight. Cueing allowed the fuse/warhead to cater for the range of closing speeds encountered in head-on or tailchase attacks, firing instantaneously in head-on attacks or with a delay in rear attacks, ensuring the ‘hoop’ of the continuous-rod warhead

RED TOP ON THE PHANTOM: WHAT MIGHT HAVE BEEN



A speculative drawing of an F-4K Phantom FG1 carrying a pair of Red Tops. Had it been developed, it would have conferred IR all-aspect capability on the Fleet Air Arm’s air defence aircraft a decade before the Sea Harrier received Sidewinder ‘Limas’ in 1982. CHRIS GIBSON

In February 1965, with an order for the McDonnell Douglas F-4K in the bag, the director of air weapons (navy) made an enquiry about arming the Phantom with Red Top, of which the FAA had a large stock for its Sea Vixens. The answer from the director, guided weapons (air), dated 14 March 1965 explained that the US Navy’s F-4s could carry six Sparrows or a combination of four Sparrows and, with an adapter on each pylon, four AIM-9D/Sidewinder 1C AAMs. These IR weapons were secondary armament for use in electronic countermeasures-rich environments where the primary weapon, the semi-active radar-homing AIM-7 Sparrow, was less effective. For the Phantom, unlike the Sea Vixen or Lightning, Red Top would be its secondary weapon.

The initial 1965 study for the Phantom was based on rear hemisphere-only attacks, not slaved to the F-4K’s Ferranti-built AN/AWG-11 radar, which would allow direct comparisons of the Red Top and Sidewinder 1C. However, if slaved to the aircraft’s airborne interception radar, Red Top would provide the Phantom with what was effectively an all-aspect capability, one that would be unavailable to Sidewinder operators until the AIM-9G entered service towards the end of US involvement in Vietnam.

Red Top would be carried on the Phantom’s inboard wing pylon, which on US Navy F-4s could take an AIM-7 Sparrow or two AIM-9 Sidewinders apiece. British Phantoms were to have the kit to provide underwing carriage of Sparrow removed from their wing pylons to save weight. Red Top carriage on these pylons required auxiliaries, such as the pure air bottles, firing circuits and power converters, which required a dedicated launch shoe that acted as an adapter/interface between the Phantom’s systems and the Red Top itself. This shoe weighed in at 150lb (68kg) while the Sidewinder adapter shoe weighed 92lb (42kg).

The 1965 report advised that while US Navy F-4s routinely carried four Sidewinders, the restrictions imposed on ‘bring-back loads’ due to British carriers being smaller meant only two Sidewinders would be carried on RN Phantoms. This would provide the same capability as two Red Tops but with a weight saving of almost 500lb (227kg). The report stated that in terms of extra fuel, the Sidewinder allowed 10 more minutes on combat air patrol or an extra circuit on recovery.

The Sidewinder beat Red Top on price, £4,000 against £14,000, plus the cost of two launch shoes per Phantom. When the Sea Vixen was replaced by the Phantom, the FAA’s stock of Red Tops was transferred to the RAF. The Royal Navy’s Phantoms did carry four Sidewinders but true all-aspect capability only reached the FAA in the form of the AIM-9L, provided in 1982 for the Sea Harrier.

Having moved to Leuchars and converted to the F6, No 11 Squadron mounted this four-ship in 1967, all with Red Tops on board. IWM/GETTY

cut into the target. In the event of a miss, the warhead self-destructed after 30 seconds' flight time.

The warhead was moved forward to behind the seeker and guidance packages. No longer wrapped around the rocket motor's blast tube, it could be larger, weighing 68lb (33kg), and use a continuous-rod design. Now known as annular blast fragmentation warheads, these are more effective against the rugged airframes of supersonic aircraft at high altitude.

The change to compact electronics and systems allowed the use of a larger rocket motor, the Linnet, with a diameter of 7.25in (18.4cm). It was integrated into the fuselage rather than being installed as a 'bottle' within the airframe, saving weight and internal space. The front end of the motor was moved aft but thanks to its blast tube being surrounded by ancillaries rather than warhead, the motor could be longer at 39in (99cm) and therefore more powerful.

The Linnet contained 76.5lb (34.7kg) of cordite and burned for 2.6 to three seconds, generating between 8,000lbf and 5,000lbf of thrust, the lower value corresponding to higher, colder altitudes encountered during Lightning sorties. The result was a longer range than the Firestreak, at six miles versus four miles, improved manoeuvrability due to having more energy in the coast phase, and a higher speed, Mach 3.2 as opposed to 3.0.

These new technologies permitted Red Top to have a longer 'stand-by' period — up to 30 minutes — before launch and improved its snap-up/snap-down capability. The interceptor could now engage targets 15,000ft above and below the interceptor's altitude, if Red Top was launched above 20,000ft, or 8,000ft above and below if below 20,000ft. The most important new capability was 'skin detection,' the 'black body radiation' mentioned above that allowed Red Top to detect and home on the heat emitted from the airframe of supersonic targets, even in the forward hemisphere, supersonic in this case being Mach 1.7-plus.

Minimum launch speed was Mach 0.7, with maximum launch speed stated as Mach 2.0 (Mach 1.7 on the Lightning F3) although later references state Mach 1.8. Minimum engagement range is listed as 2,000 yards (1.1 miles) with the missile's maximum range being 12,000 yards (6.8 miles).

Compared with modern missiles Red Top took time to 'warm up' — and cool down — typically two minutes. In addition to cooling the seeker, this pre-launch period spun up the seeker's gyros and warmed the missile electronics. The fire control system passed the 'angle forecast' to the missile to factor in the closing speed, to set the fuse and detonation point. At the point of launch, the pure air supply changed from the aircraft weapons pack to the missile's on-board air bottles.

As the Linnet motor fired, and once sufficient thrust had built, a retaining bolt sheared, permitting the missile to move forward and leave the launch rail. When it left the rail, a trigger on the launch shoe initiated the control fin unlock system, allowing the control system to operate. The warhead

FURTHER DEVELOPMENTS

A Red Top Mk2 was proposed by de Havilland in 1960 with the Linnet replaced by a packaged, storable liquid rocket engine that would confer higher performance and be easier to store, especially on aircraft carriers. This was followed by Red Top Mk2 Plus with a larger-diameter solid motor to increase speed and range while improving Red Top's engagement envelope.

British radar missiles had long been criticised for their size and lack of capability. By May 1957 the semi-active US Sparrow III — which became the AIM-7 — had become the benchmark weapon. The options were to buy the Sparrow or develop a radar-guided Blue Vesta, initially known as Blue Jay MkV, though somewhere along the line the name Blue Dolphin became associated with the project. Radar guidance was being driven by the Fleet Air Arm to equip the Sea Vixen as it tended to operate at lower altitudes, probably in cloud, than the Lightning. The Sea Vixen's AI18 radar could be modified to provided pulsed or continuous-wave (CW) radar illumination of the target, but the modification would not be easy.

The FAA preferred CW radar, as this would be less prone to jamming or 'Window' compared to a pulsed radar. GEC's A. R. G. Dunkley advised that such a semi-active weapon, "may impose considerable restrictions on the permissible manoeuvres of the fighter after launch."

This posed a problem for the Lightning and its AI23 radar, which would need 'CW injection'. Since a completely new or separate CW illuminator was difficult, a means of feeding CW to the AI23 antenna was suggested. Ferranti, makers of the AI23, advised this would require a rotating joint in the feed, which was not possible. The RRE was unconvinced.

Blue Dolphin was cancelled but by 1962 — and with Red Top well into its development — Gp Capt Burges, assistant director of guided weapons (air), advised his superiors a radar-guided version of Red Top was possible. This 'Radar Red Top' should use a CW seeker rather than a pulsed seeker being studied by Ferranti. However, the French company Générale Aéronautique Marcel Dassault was already developing a pulsed radar seeker for the Matra R530. English Electric's Ray Creasey noted that the cost of developing either the CW feed or the pulse radar seeker for Red Top would be "prohibitive" and indicated that using the R530 seeker was the best option for the Lightning. Burges advised that Ferranti should be directed to study the "incorporation of the Matra R530 pulse radar head in Red Top" and advise of any modifications required to the Sea Vixen's AI18R and the Lightning's AI23B, "if any."

armed once accelerometers in the guidance package sensed the acceleration was sustained.

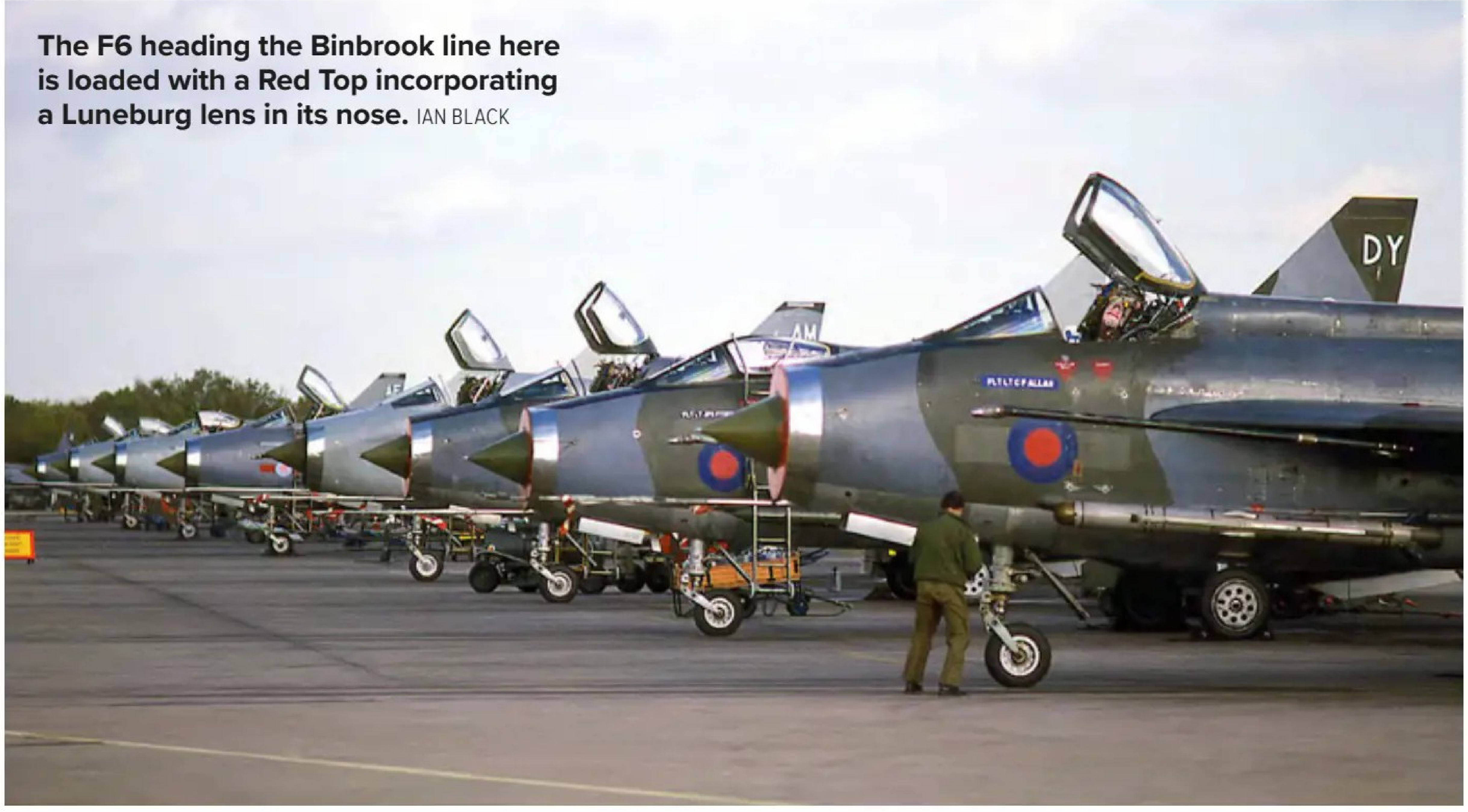
The motor burned for around three seconds, increasing the Red Top's speed by Mach 1.7 above the launch speed. The missile then coasted and was slowest at interception point. Manoeuvring reduced speed during the coast phase, so Red Top's higher speed conferred an improvement in manoeuvrability thanks to the missile having more energy in the coast. This was one reason the interceptor's speed should be kept as high as possible at launch.

Aside from a hiccup in early 1961, Red Top appears to have made rapid progress, certainly in comparison with other British guided weapons. Research and development flight trials began in November 1958, initially powered by Magpie motors from Firestreaks until Linnets became available. Ten trials rounds featured the pyramidal nosecone. As development advanced, firings from a Canberra in 1960 were followed by the first launch from a Lightning in September 1961, and on 21 February 1962 the instruction was issued that development should continue. The intention was to order 2,636 Red Tops for RAF and FAA use on Lightnings and Sea Vixens. Trials work continued into December 1963, when evaluation commenced, lasting until December 1966. These trials and wind tunnel work revealed that, compared with the Firestreak, the aerodynamically cleaner Red Top affected the Lightning's high-speed stability, prompting modifications that resulted in the square-topped tail fins of the Lightning F3, T5 and F6.

An order for 2,000 Red Tops was placed in March 1962, with a further contract for 500 the following May for the Fleet Air Arm's Sea Vixen FAW2s. First deliveries of Red Tops to the RAF and FAA led to entry into service towards the end of 1964.

Red Top remained in the Fleet Air Arm inventory until 1972 when the last Sea Vixens were withdrawn. The RAF, on the other hand, kept the successful Lightning/Red Top — and Firestreak — team together until the Lightnings were retired in April 1988. The Royal Saudi and Kuwait Air Forces used Red Top on their Lightnings up to 1986 and 1987 respectively.

Thanks to Tony Wilson, James Jackson and Paul Martel-Mead.



The F6 heading the Binbrook line here is loaded with a Red Top incorporating a Luneburg lens in its nose. IAN BLACK

CREAM OF THE CROP

What were the pluses and minuses of Red Top from a pilot's perspective?

WORDS: IAN BLACK

Walking into No 11 Squadron's crew room in the late 1980s saw you surrounded by memorabilia from times past: uniforms from the Royal Flying Corps, propellers, parts of downed aircraft and photos aplenty. Behind the coffee bar the standard aircrew fridge, which ought to have sported several government health warnings, was perhaps a bizarre place to learn more about the Lightning pilots' missile of choice. Our daily milk supplies arrived with three coloured tops, one gold, one silver and one red: opening the fridge door saw compartments marked 'Firestreak,' for semi-skimmed, and 'Red Top.'

A few feet behind, the World War Two-era hangar was home to a dozen-plus Lightnings, a mix of single and two-seaters, each capable of being armed with a pair of either Red Tops or Firestreaks. Red Top was the favoured weapon for the Lightning F3 and beyond, but with only one other type equipped to carry it — the Sea Vixen — it was a bit of an enigma. The missile itself, while capable of shooting down a head-on target, had some fairly serious limitations. In the early days it was very difficult to carry out live head-on firings against realistic targets. Red Top guidance relied on the seeker acquiring the kinetic heat off the leading edge of the wing surfaces, and the target needed to be supersonic head-on.

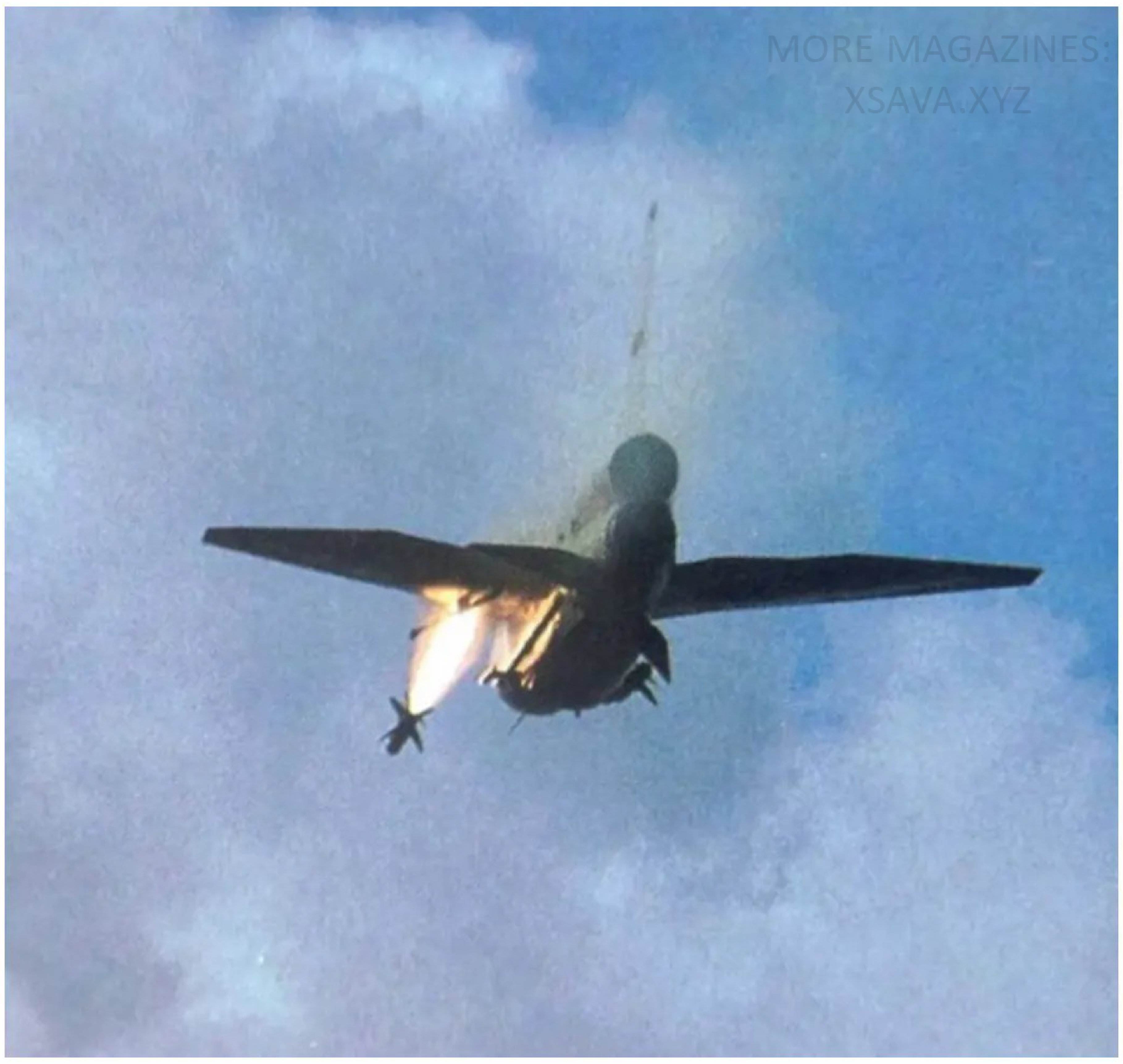
When the missile entered service with the Lightning F3/T5 in 1964-65, it was a double-edged sword. The RAF had gained its first head-on missile-capable fighter but it also, for the first time in its history, possessed a main fighter that lacked any guns. Despite its undoubted advantages the missile required the later version of the Ferranti AI23 radar and the F2As, for example, could never carry Red Top. Nevertheless it soldiered on until 1988.

For QRA, Red Tops were generally fitted over Firestreak to allow the head-on shot to be taken. In reality there were, however, some major drawbacks to the weapon. There were only ever two fitted, one either side of the forward fuselage, which gave an obscuration problem. As an example, the left-hand missile would have difficulty seeing a target on the right-hand side, and vice versa. There were also some restrictive firing limits by today's standards. The g constraint was +4g, which was pretty limiting in combat, and the minimum speed was 300kt, not great in a slow-speed fight.

An often overlooked disadvantage was that, after the withdrawal of the Sea Vixen, the Lightning was the sole user of this big missile. Part of the strategy of Cold War NATO was that all fighter types could be refuelled and rearmed at other fighter bases. This meant keeping stocks of Red Tops at airfields that were not familiar with the weapon. Unlike the Sidewinder, which could be lifted by two men, the Red Top needed to be winched onto the mounting shoe using a specialist trolley and winch. Everything Lightning was designed to be rapid and no planning had been made for sorties of four-plus-hour duration where the missile would need to be armed for long periods. In fact, once armed you probably had around 30 minutes of cooling time for the seeker head.

From a tactical perspective the original concept was for the Lightning pilot to lock

RIGHT: Store away — viewed from the back seat of a Hawk a millisecond after trigger press, the rocket motor fires, the Red Top's fins are unlocked and the missile is already past the nose of the Lightning.
VIA IAN BLACK



MORE MAGAZINES: XSAVA.XYZ

RIGHT: Ready for an armament practice camp sortie out of Valley.
IAN BLACK

onto the target and then follow the steering command dot in the radar symbology. Given the poor detection range of the radar, you would be lucky to acquire a target outside 25 miles. With the fighter approaching a target at Mach 1.6, giving 32 miles of closure, you were literally into the seconds before weapon release. Squeezing the trigger, the missile would wait until the optimum moment to fire. With only two missiles it was a tricky exercise to fire one head-on, break out and start a turn at Mach 1.6 to try and get behind the target inside two miles and take a second shot. The advent of radar warning receivers on most aircraft post-1970 also meant locking onto your target was not tactically clever.

> *“The missile would wait until the optimum moment to fire”*

Day-to-day squadron operations saw a mixture of both Firestreak and Red Top-armed aircraft. A few carried a specially adapted Red Top with a Luneburg radar reflector lens in the nose of the missile. This gave the fighter a greater radar cross-section to aid detection during intercept training. While its head-on capability was limited to high-altitude supersonic bombers or recce aircraft, the Red Top did acquit itself well at low level. Most of our attacks were designed to be performed with the radar in search mode, trying to sneak behind the target for a stern-aspect shot within 30° of the tail at around one to two miles.

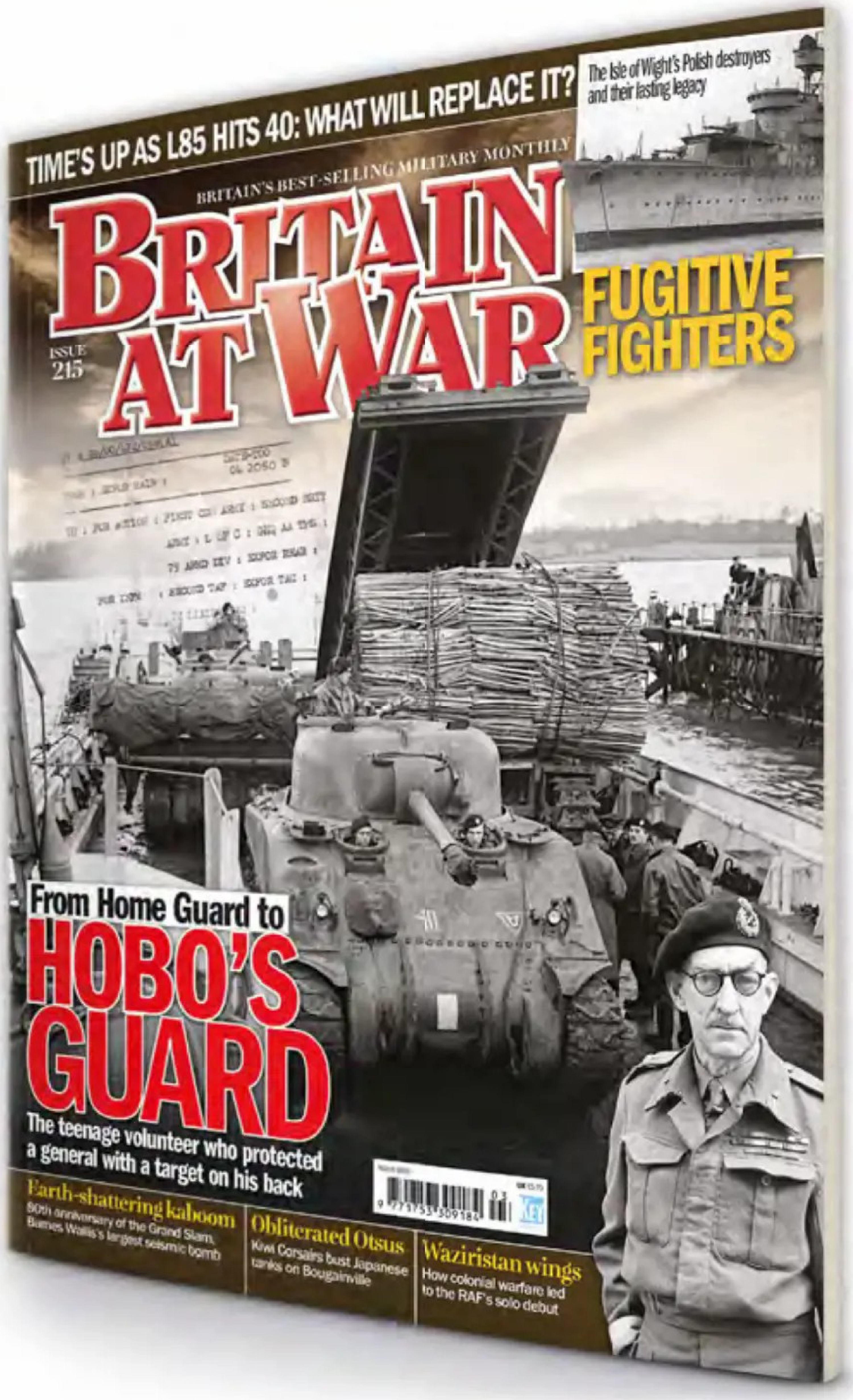
In terms of which was the best out of Firestreak or Red Top, the Firestreak was probably the more reliable but Red Top had a better motor that burned for just 2.5 seconds and accelerated the missile to Mach 1.7 above launch speed — impressive if you were doing 1.5. The warhead was an expanding rod of 40ft that would certainly down any target. Despite the Lightning force retaining hundreds of live missiles prior to withdrawal, no plans were made to fire off the stock, so they were simply disarmed and broken up.

KEY Publishing

THE DESTINATION FOR HISTORIC ENTHUSIASTS

Visit us today and discover all our latest releases

WIN: BOMBER SIM EXPERIENCE WITH LANCASTER FLIGHT UK
CLOSING DATE JUNE 5, 2025
FlyPast
The Heart Of Aviation Heritage
THUNDERSTRUCK!
Republic P-47 Thunderbolts double up!
KILLER IN THE MIST
B-17 tragedy remembered 80 years on
WINGS AVIATION MUSEUM
Sussex hidden gem profiled
DICING WITH DEATH
F-101 Voodoo refuelling incident
'FLAK-BAIT'
From combat to preservation
News, opinion, reviews and much more
FLYPAST CLASSICS
Consolidated B-24 Liberator
The bomber that could "take it and dish it out"


TIME'S UP AS L85 HITS 40: WHAT WILL REPLACE IT?
The Isle of Wight's Polish destroyers and their lasting legacy
BRITAIN'S BEST-SELLING MILITARY MONTHLY
BRITAIN AT WAR
ISSUE 215
FUGITIVE FIGHTERS
From Home Guard to HOBO'S GUARD
The teenage volunteer who protected a general with a target on his back
Earth-shattering kaboom
Obliterated Otsus
Waziristan wings

THUNDERSTRUCK!
The April 2025 issue of FlyPast features a sight rarely seen in the skies since World War Two – two Republic P-47 Thunderbolts in the air together. They are owned by Tennessee airmen Neal Melton and John Shoffner, who have chosen to maintain these mighty warbirds in the environment where they belong, and what a sight and sound they are.

'FLAK-BAIT'
Despite its name, one Martin B-26 Marauder seemed almost invincible in war-torn skies. Alan Crouchman tells its epic story

FLYPAST CLASSICS: B-24 LIBERATOR
Although its legacy may be less revered than that of the Boeing B-17 Flying Fortress, the Liberator was as capable a bomber and played a vital role in World War Two

SALVATION FROM ABOVE
Operations Manna and Chowhound were missions of mercy, flying in food to those most in need. Tom Allett reflects on these extraordinary enterprises

FROM HOME GUARD TO HOBO'S GUARD
The teenage volunteer who protected a general with a target on his back

TIME'S UP AS L85 HITS 40
What will replace the British service rifle?

FUGITIVE FIGHTERS
The Isle of Wight's Polish destroyers and their lasting legacy

EARTH SHATTERING KABOOM
80th anniversary of the Grand Slam, Barnes Wallis's largest seismic bomb

OBLITERATED OTSUS
Kiwi Corsairs bust Japanese tanks on Bougainville

WAZIRISTAN WINGS
How colonial warfare led to the RAF's solo debut

SIMPLY SCAN THE **QR CODE** OF YOUR FAVOURITE TITLE ABOVE TO FIND OUT MORE!

Order from our online shop...

shop.keypublishing.com/collections/subscriptions

Call **+44 (0)1780 480404** *(Monday to Friday 9am - 5.30pm GMT)*

**Free 2nd class P&P on BFPO orders. Overseas charges apply.*

331/25

WORKING THE WHEELBARROW

The 'Whistling Wheelbarrow' moniker didn't nearly sum up the Armstrong Whitworth Argosy well enough. Yes, it was a useful cargo-hauler, but it performed other roles too, such as navigation aid calibrator and VIP transport — as this ex-Argosy co-pilot remembers **WORDS:** RICK HARLAND

My association with the Argosy began in September 1972, after multi-engine training on the venerable Vickers Varsity with No 5 Flying Training School at RAF Oakington near Cambridge. I was a little surprised to be posted to an Argosy unit, No 115 Squadron, as I was under the impression that all the Argosies had been retired and knew nothing of 115's main role calibrating radio navigation and approach aids, usually referred to for brevity as flight checking, but I was about to find out. 115 operated the Argosy E1, the E standing for electronic, though the airframe was visually identical to the C1 other than the calibration aerials on the nose and under the fuselage.

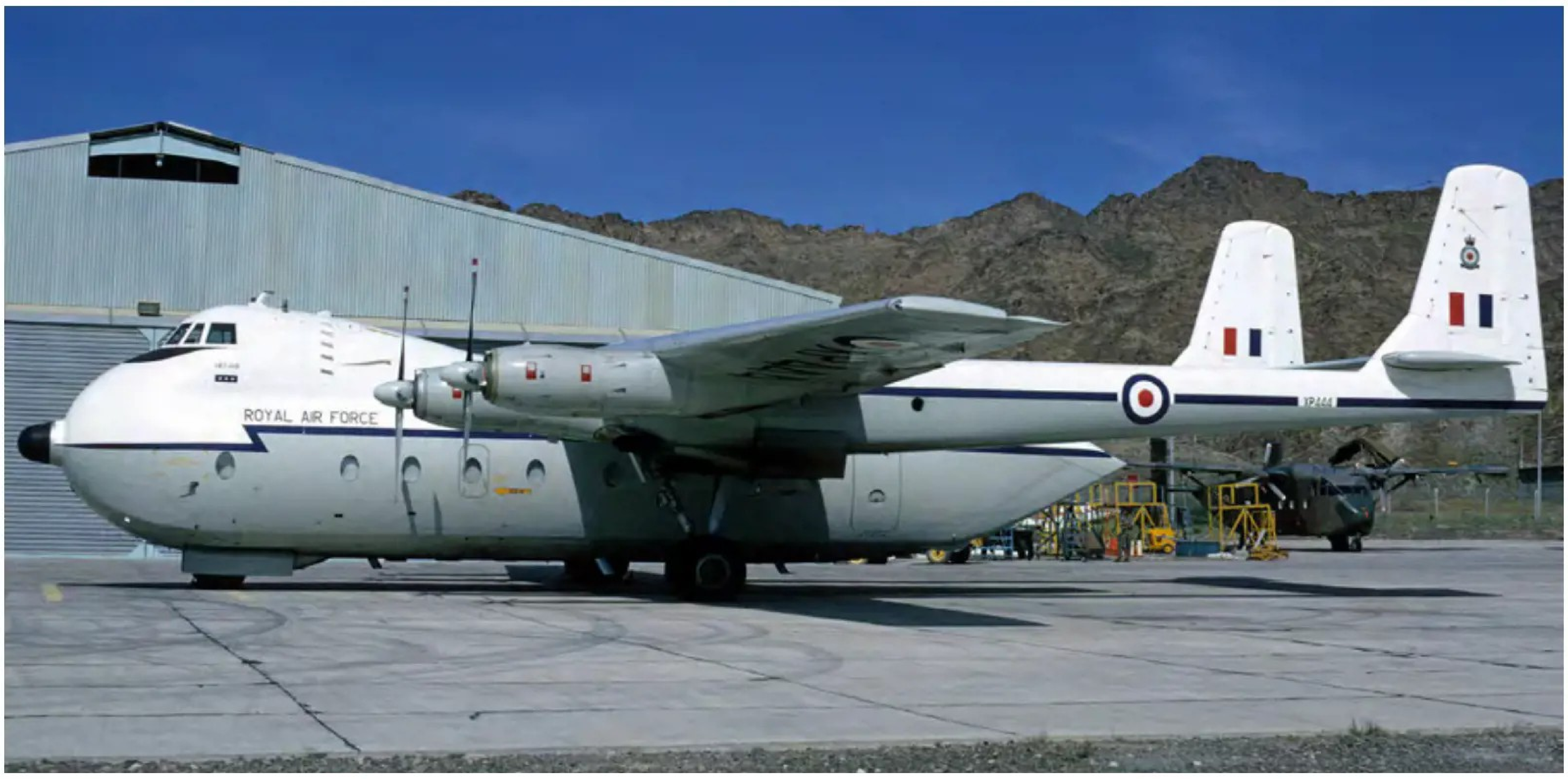
RAF Cottesmore, the only active military airfield in the tiny county of Rutland, was shared by 115 and three Canberra units: No 98 Squadron, the high-level radar calibrators, No 231 Operational Conversion Unit training on T4s, and No 360 Squadron, a joint RAF/Royal Navy squadron providing electronic countermeasures training and facilities with the T17, not the best-looking variant with all its lumps, bumps and aerials. It was a very busy place. By this time, the erstwhile Argosy OCU at Thorney Island had long since become the Hercules OCU, so my training — along with that of another new co-pilot — was carried out 'in-house' by squadron instructors, as it had been in the latter years of the Argosy transport squadrons at Benson.

Instruction started with ground school covering aircraft technical subjects, an early three-day detachment to the Argosy simulator at Benson — the last remaining trace of the Benson wing — taking in 12 hours of drills, procedures and familiarisation with the Smiths MFS (Military Flight System), the flight director instruments portraying radio navigation aids and height and heading information. The simulator's 'visuals' consisted of TV screens in front of each pilot, fed from a camera on a gantry moving over a very large, vertically mounted 3D model of the Benson area. The visuals weren't often used, but it wasn't unheard-of for the simulator staff to enliven proceedings by modifying the scenery with additions such as a 'Road Up' sign across the runway, or a giant plastic fly sitting on the airfield. There were a couple more, longer simulator detachments during the ground school phase dealing with circuits, instrument approaches, route navigation and airways flying without roadworks, providing a total of 53 further hours in the sim.

> ***"I was under the impression that all the Argosies had been retired"***

The final stage of ground training encompassed an initiation into the mysteries of the procedures for calibrating instrument landing systems

LEFT: At Boscombe Down on 13 July 1972, Argosy E1 XR140 of No 115 Squadron makes a flypast. The calibration variant is just distinguishable by virtue of the small aerials on either side of the nose and a larger aerial array beneath the fuselage.
ADRIAN M. BALCH



LEFT: The Near East Air Force VIP transport was XP444, which sported a three-star emblem below the name *Helios*, just beneath the cockpit. On 24 April 1972 it was at Bayt al Falaj, then the main airport for the Omani city of Muscat and its air arm's primary base, hence the Sultan of Oman's Air Force Shorts Skyvan parked behind.
ADRIAN M. BALCH COLLECTION

450
ROYAL AIR FORCE NEAR EAST

ABOVE: El Adem was a familiar port of call for the No 70 Squadron Argosies — such as the newly camouflaged XP450 during March 1968 — before the RAF pulled out in 1970.
ADRIAN M. BALCH COLLECTION

(ILS), precision approach radars (PAR) and surveillance radar elements (SRE). The first two of these provided electronic guidance for both centreline and glidepath, categorised then as runway approaches but later renamed as precision approaches.

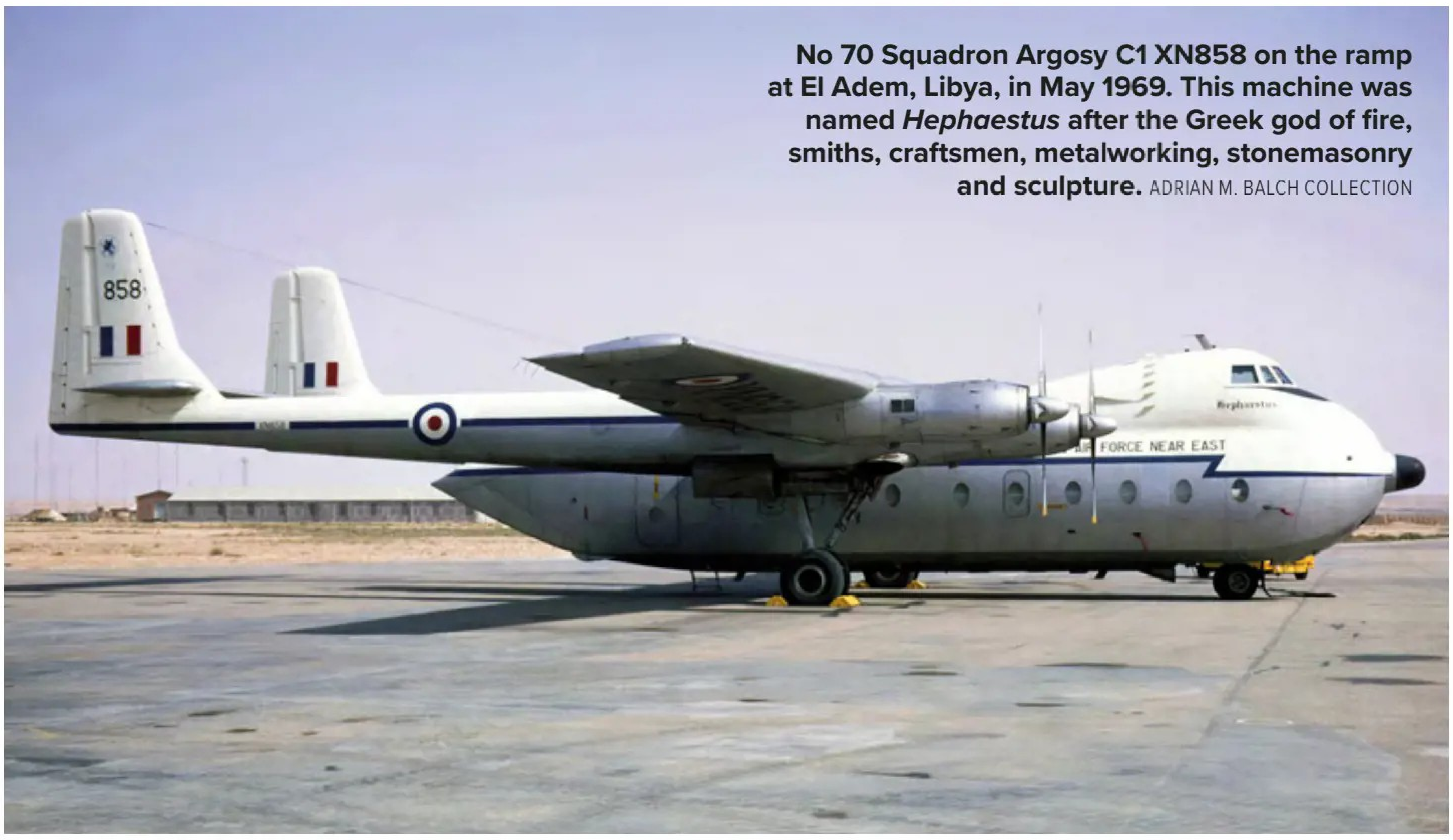
The ILS installation consisted of two transmitters, the localiser (centreline) being positioned at the far end of the runway and the glidepath beside the runway at the touchdown end, the standard approach angle being 3°. Both transmitters were duplicated as a safety back-up. Usually found only on military airfields, the PAR featured two co-located transmitters with a narrow sweep-width, one oscillating vertically (glidepath) and the other horizontally (centreline). These were mounted in a rotatable hut that could be aligned from the control tower to any of the airfield's runways. The talk-down controller's two screens had two parallel 'tramlines' between which he or she would aim to keep the approaching aircraft by giving small heading and rate of descent adjustments down to the pilot's approach minimum, after which advisory information would be given down to touchdown. The glidepath tramlines were adjustable to enable the 'jet jockeys' to fly a shallower approach, typically 2.5°, thus allowing a higher power band for better engine response at approach speed. The SRE, a function of an airfield radar — usually an AR-1, or alternatively a shorter-range ACR 430 airfield control radar — gave centreline guidance through a talk-down controller who would also provide advisory height information with aircraft range from touchdown, the category being airfield or non-precision approach.

Less frequent tasks included checking of UHF direction-finding equipment and TACAN (tactical air navigation) radio beacons, a military navaid giving range and bearing, selected via channel numbers rather than frequencies, and having an air-to-air function on two specific channels — very useful for fast jet crews when trying to find their tanker. There was a network of TACAN routes in northern Europe, controlled by NATO military radar units and used by the RAF mainly for flights between the UK and the four RAF Germany bases, Brüggen, Wildenrath, Laarbruch and Gütersloh. Airfields with a TACAN also usually provided TACAN approach procedures, a non-precision approach but, like the ILS, pilot-interpreted via flight instrument presentation.

> ***“Having flown eight of 115's nine Argosies, it was down to work”***

Eventually, after all the classroom and sim work, we got to fly the real aircraft — a bit of a change from the Varsity, with a crew of four on the flight deck — and learn the niceties of crew co-operation. The most novel part of this on the Argosy was that the flight engineer handled the power throughout a flight, except during take-off and landing. The operating pilot would call for a required power setting, either a standard setting such as climb or cruise power, or in the circuit or instrument pattern a torque setting to achieve a required speed or rate of descent. In the climb and cruise, the 'eng' synchronised the engines using the synchrometer, a small dial on which three miniature propellers rotated clockwise or anti-clockwise to indicate the engine speed of the other three relative to the master engine, adjusting the throttles until all were steady. With that done, he altered the fuel flow using 'fuel trimmers' to achieve the appropriate turbine gas temperature. Climb power was 15,000rpm and TGT 800°C, and cruise 14,500 and 785°C, usually spoken as "fifteen thousand, eight hundred" and "fourteen five, seven eight five."

In mid-January 1973, after the conversion course — during which I had flown eight of 115's nine Argosies, completing the set the following week — it was straight down to work. My first task was an operational flight check of the ILS at RAF St Mawgan in Cornwall. The OFC consisted of flying a set pattern, directed by the navigator, around and across the localiser, checking the range and signal strengths at given positions,


No 70 Squadron Argosy C1 XN858 on the ramp at El Adem, Libya, in May 1969. This machine was named *Hephaestus* after the Greek god of fire, smiths, craftsmen, metalworking, stonemasonry and sculpture. ADRIAN M. BALCH COLLECTION

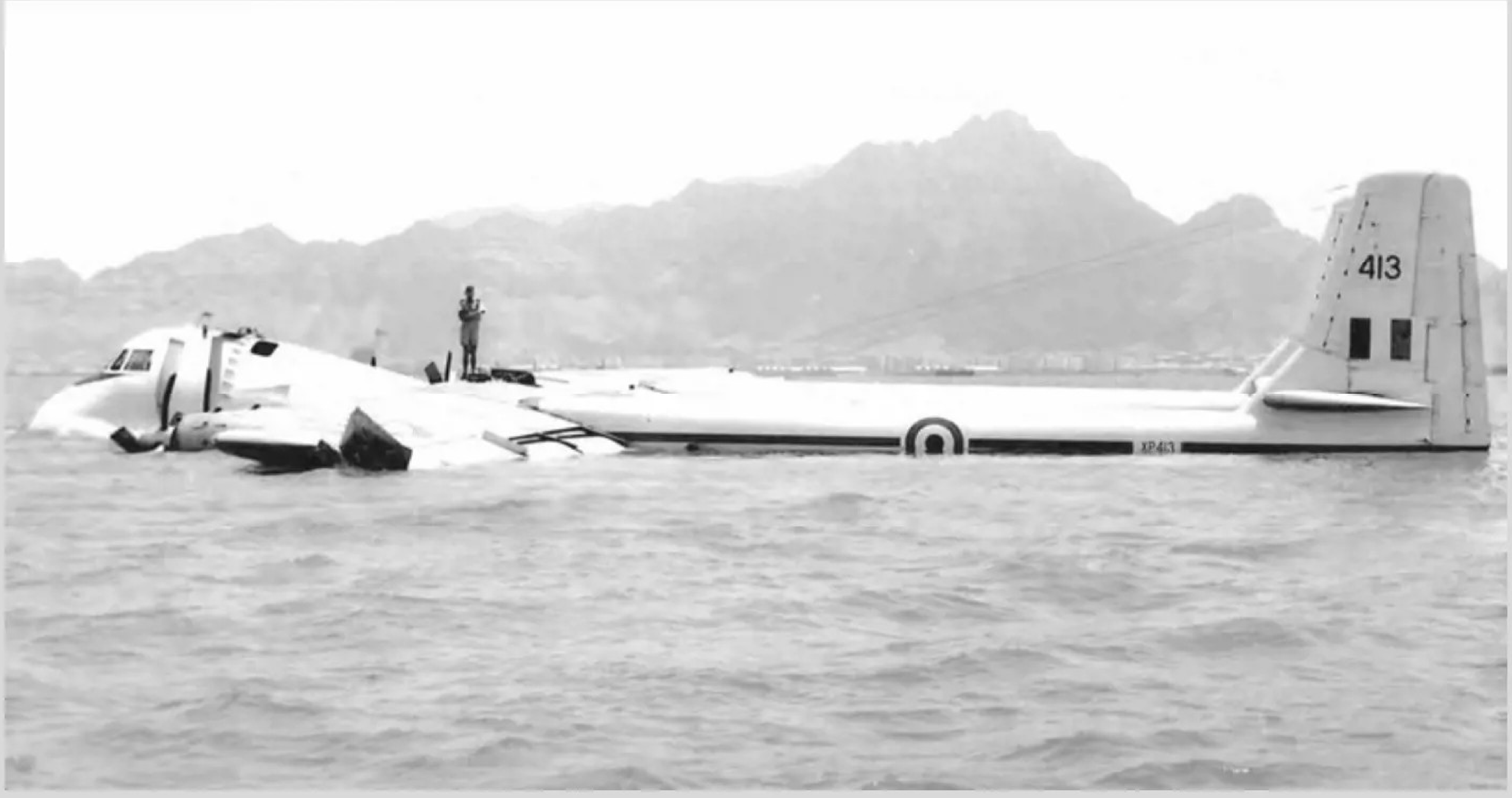
followed by a stepped approach in a series of 'glidepath slices' at various heights and ranges, the final slice being at 1nm, level at 318ft. It was the nearest we got to low flying on 115! The pattern was repeated for the second set of transmitters. The signal strengths were recorded on the calibration consoles in the freight bay at the different points of the pattern by the squadron's air electronics operators/officers and technicians from No 90 (Signals) Group for subsequent analysis and adjustment. That sortie, including transit, took four hours 10 minutes.

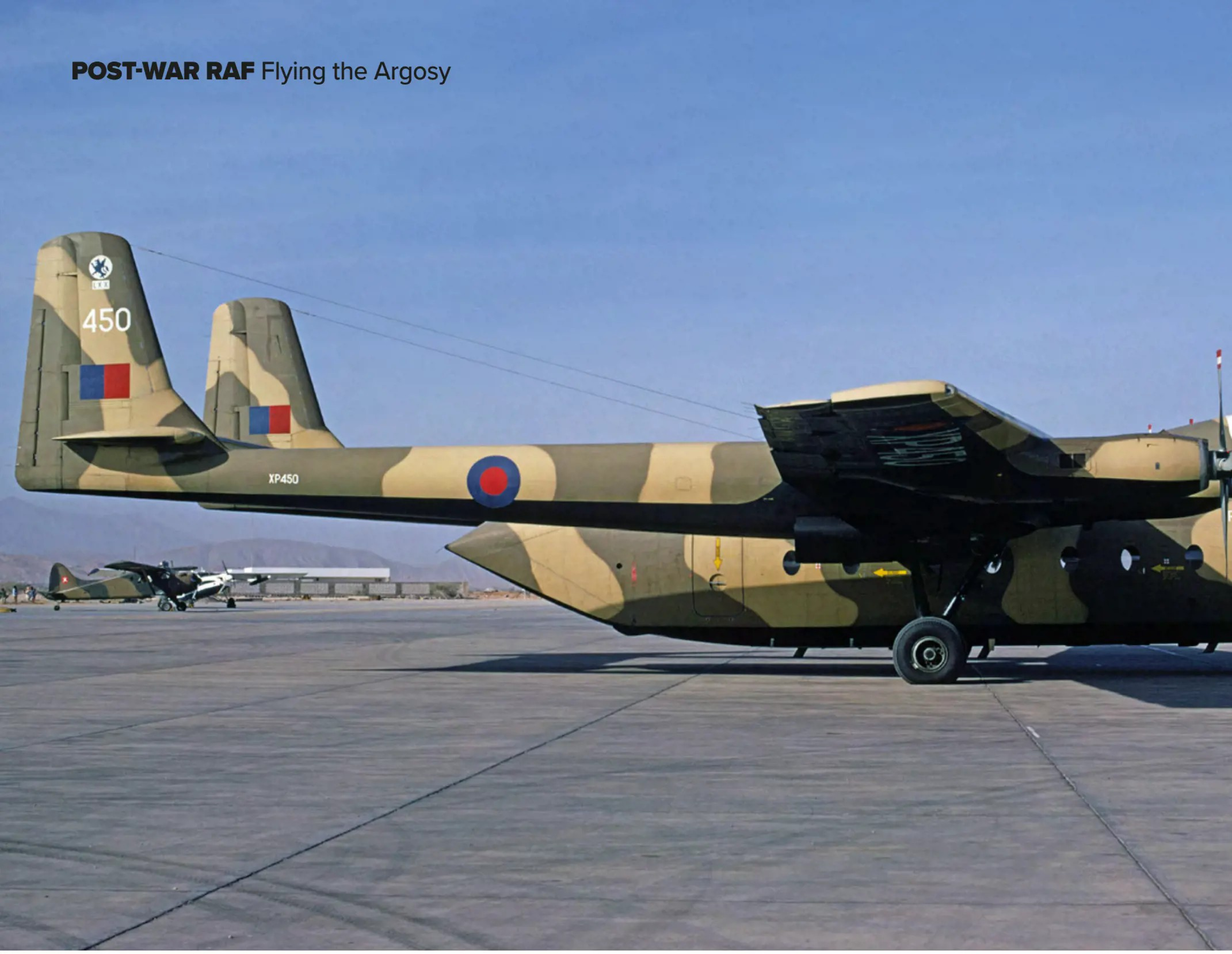
The following day, I was on a theodolite calibration of RAF Wyton's PAR, a much longer procedure than an ILS OFC — in this case, nearly six hours' flying. We dropped off the radar technicians to go to the tower and PAR hut and the AEO, with his theodolite and radio, to the appropriate point on the airfield, normally starting at the far end of the runway for centreline runs. The calibration runs required good visibility, at least 6nm, as the AEO — using the callsign 'Theo' — had to talk the aircraft down along the centreline while looking through the theodolite aligned with the runway, giving a continuous series of corrections to the pilot to keep him on centre. The Argosy's radome made a very useful visual target for 'Theo' talkdowns. It also gave rise to the type's less polite nickname, the 'Whistling Tit'. Every time 'Theo' called "on", the 'techies' noted the position of the blip on the PAR screen to ascertain its accuracy. Once the necessary centreline runs and adjustments were complete, 'Theo' would be moved to the touchdown point for glidepath runs until all was satisfactory.

No 115 Squadron's fleet of Argosies had a certain symmetry, with three aircraft from each of the three production batches, including the first AW660, XN814, and the last, XR143. The others were XN816 and '855, XP413, '439 and '448, and XR137 and '140. As with the transport Argosies, all nine carried a squadron logo outboard at the top of the fins, this being an adaptation of an approach chart symbol for an ILS, a blue and yellow arrowhead, blue representing the 'fly left' lobe of the localiser signal and yellow the 'fly right'; on this was the squadron number 'CXV' in red. Some aircraft, such as XN855 and XR137, also had on both sides beneath the flight deck a double arrowhead framing the squadron's emblem of a hand holding a tiller, with a name from Greek mythology above and 'CXV' below.

"SINK, YOU B******, SINK!"

When it was with No 115 Squadron, Argosy XP413 bore a marking probably not carried by any other aircraft: a plimsoll line in dayglo on the port side of the nose, recalling its accident in Aden during asymmetric training in March 1964 when it undershot Khormaksar's runway and ended up on its wheels in shallow water just offshore. It was recovered, stripped down, shipped back to Armstrong Whitworth and repaired at Bitteswell. Later, during XP413's service with 115, the calibration console was adorned with a photo of it in the water with the hand-written caption, "Sink, you bastard, sink!"


Semi-submerged in Aden harbour after its unfortunate 23 March 1964 mishap, XP413 awaits recovery. MARTIN WILLING COLLECTION



ABOVE: The new style of low-visibility roundel on camouflaged RAF aircraft appeared on No 70 Squadron's 'Brown Bomber', XP450, before its retirement. Muscat's new airport at Seeb opened at the beginning of 1973, just under two years before this December 1974 visit. At left are a Sultan of Oman's Air Force DHC-2 Beaver and a Pilatus PC-6B Turbo Porter of the Omani police. ADRIAN M. BALCH COLLECTION

The highlight of my first year's operational flying was a 'Safari' to calibrate all the navaids at Gan, by then the RAF's most easterly base after the withdrawal of the Far East Air Force, which had been the main staging post in the Indian Ocean en route to Singapore. Gan was the southernmost point of the horseshoe-shaped Addu Atoll in the Maldives, a mere 40 miles south of the equator, and the 8,697ft east-west runway started at one end of the island and finished at the other. The main domestic part of the station was north of the western threshold, interspersed with tall palm trees inhabited by a substantial population of fruit bats — wingspan about 4ft (1.5m) — which fortunately had the sense to keep away from the runway, to the mutual benefit of both bats and aircraft.

Our route to Gan was to Akrotiri as non-operating crew, thence — with Flt Lt Dave Gallanders as captain — via Tehran to Masirah, an island off the south-east coast of Oman, on 22 April 1973. We had to fly to the new Seeb Airport at Muscat on the 23rd to fuel up for the next day as Masirah was low on Avtur, one hour there direct and one hour 25 minutes back round the coast, as we were too heavy to make safety altitude over the mountains. The 24th took us to Gan via Bombay, now Mumbai. Our navigator, Flt Lt Stan Lynch, told us at flight planning that our initial stabilising level in the event of a double engine failure would be in fathoms if we were delayed from our early morning departure — too hot and heavy! However, we made it to Gan on our reliable Dart engines, ready to start three days of calibration.

◆

Day one was a routine PAR check. The next featured a double check: first the TACAN, checking range and bearing against visual pinpoints around the atoll and an island called Fua Mulaku, about 40nm north-east of Gan, followed by the AR-1 — usually done by a No 98 Squadron Canberra in Europe — involving a climb to 20,000ft overhead, which took a while. The flight lasted six hours 40 minutes, and all went well except that the pinpoint on Fua Mulaku was 2nm out, so our final day's flight checking included a recheck of the TACAN after some attention from the technicians, in addition to the scheduled ILS calibration, with the same result. After some navigatorial detective work back at Cottesmore, Stan discovered the RAF map had the island mis-plotted, compared with an old marine chart. Having amassed more than 38 hours' flying in six days, we went home by RAF VC10, leaving another No 115 Squadron crew to finalise the calibrations and bring the Argosy back.

My first operational tour came to an unexpected, but by no means unpleasant, end in September 1973 when I was posted with a fellow co-pilot to No 70 Squadron — known by its Roman numerals LXX — at Akrotiri in Cyprus. An airfield even busier than Cottesmore, it also hosted No 56 Squadron's Lightnings, Nos 9 and 35 Squadrons' Vulcans, a

Hero
YAL AIR FORCE

Canberra detachment and No 84 Squadron's SAR Whirlwinds. LXX was then operating six Hercules and three Argosy C1s, the final transport Argosies still on RAF strength, but the Argosy Flight only had four pilots, all captains. Two of them were the nominated VIP pilots for the AOC-in-C Near East Air Force's Argosy, XP444, which was technically on HQNEAF's charge rather than the squadron's. The other two aircraft were XP412 and XP450, the last operational camouflaged Argosy, known as 'the Brown Bomber'.

The Argosy Flight's regular tasks, carrying both passengers and light freight, involved the 'Gib run'. This saw us traversing the length of the Mediterranean via Luqa in Malta to Gibraltar on day one, typically a total of around 10 hours' flying, crew rest on day two, and back to Akrotiri via Luqa on day three, about nine hours. These routes were flown mostly on direct tracks, off the normal airways. During one such flight, on the Akrotiri-Luqa leg, we were heading west, south of and parallel to Crete, when we noticed the air speed was gradually reducing. All the engines were OK, and it transpired we were in the downside of a powerful standing wave generated by the combination of a stable airmass and a northerly wind over Crete's long, 6,000ft-plus mountain range. The autopilot in height lock was reducing speed to maintain our flight level of FL160, about 16,000ft. We ended up at minimum climb speed with maximum ('increased ops necessity') power, losing nearly 3,000ft before we were clear of the downdraught and able to regain height.

On another occasion, en route from Luqa to Akrotiri, we were intercepted by an A-7 Corsair II, presumably from the US Navy's Mediterranean Fleet or out of the USN base at Souda Bay on Crete. Our captain decided to have a little fun with our escort and slowly reduced speed. He stayed with us, probably out of curiosity, and as we got below 150kt he opened the Corsair's big ventral airbrake to lower his minimum drag speed to hold formation as we slowed. Eventually, though, he fell away.

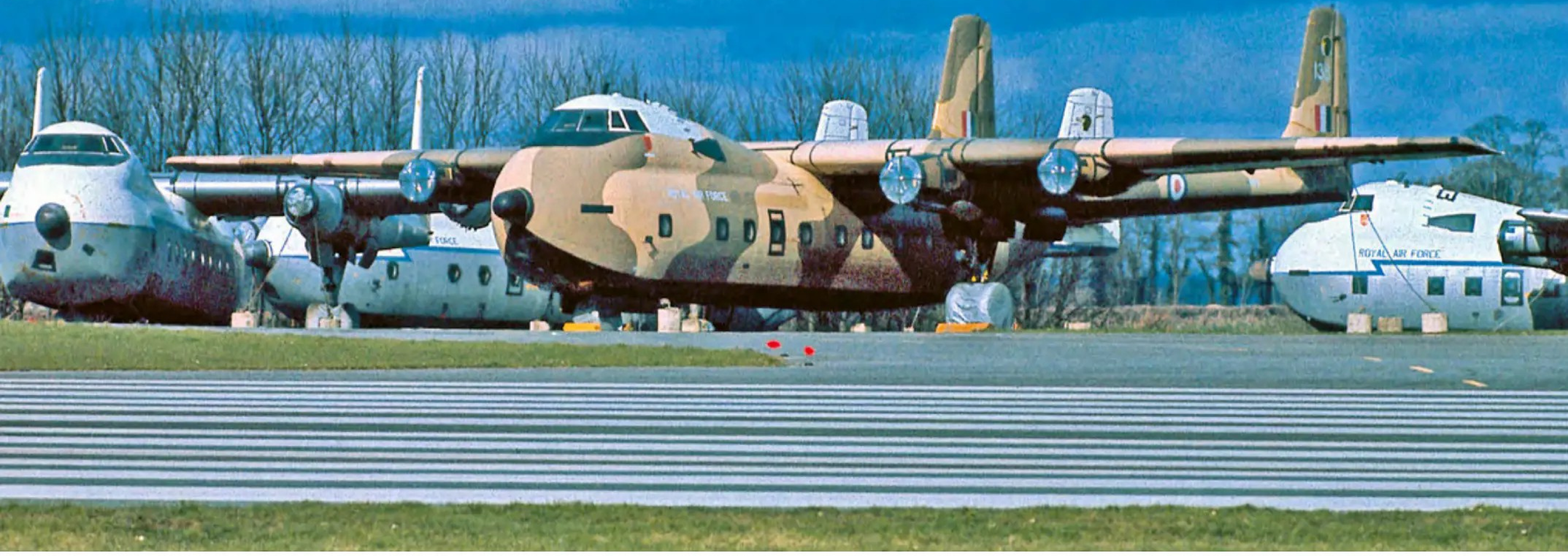
By comparison, our other regular routes around Turkey to Istanbul, Ankara and İzmir in support of the UK embassy and consulates were relatively uneventful. In addition to these jobs, along with routine continuation training, air tests and sporadic tactical and SAR sorties, the Argosies carried out flights supporting both NATO and CENTO commitments. The Central Treaty Organisation, originally known as the Middle East Treaty Organisation, existed from 1955-79 as a military alliance between the UK, Turkey, Iraq, Iran and Pakistan.

In December 1973, two months into my tour, I was engaged in the tail end of a CENTO task which had nearly been a disaster. As the Argosy was departing Tehran for Ankara in wintry weather with several senior officers on board, the crew experienced an aileron restriction as they started a turn on the standard instrument departure and were initially unable to stop the aircraft rolling into the start of a spiral dive. Fortunately, with both captain and co-pilot on the controls, the restriction was overcome and the aircraft recovered to the climb, a rather shaken crew opting to continue to Ankara rather than return to Tehran through a heavy snowstorm. The aeroplane was grounded for inspection on arrival, so the squadron was quickly tasked with taking a team to Ankara to carry out an investigation and recover the crew and remaining passengers to Akrotiri. I flew with Sqn Ldr Bob Scott, the Argosy flight commander and VIP captain, in XP444, the only Argosy available, so the rescued crew and passengers returned to Cyprus in some deserved luxury. That was the only time I got to fly the VIP Argosy on task, other than training or air test flights.

After the investigation, as no physical restrictions were found in the control runs, it was considered probable that the control problem had been caused by impact icing, a rapid build-up of wet snow which — thankfully temporarily — jammed the ailerons. A similar issue had been encountered during the early operations of the Argosy fleet, caused by the freezing of the control runs due to moisture ingress allowed by poor airframe sealing, but this fault had been cured in 1963 and so was felt unlikely. A contributory factor may have been the Argosy's aileron design, in that they were moved aerodynamically by servo tabs rather than a direct control cable.

> ***"We ended up at minimum climb speed and max power"***

I flew on another CENTO task in June 1974, this time the entire route in support of its annual conference being held in Pakistan. We departed on 1 June to Ankara to pick up the delegates from their HQ, and thence to Batman, a Turkish Air Force base with RF-84s. The group was due to visit Diyarbakır, where the main runway was being resurfaced, and was transferred by Turkish C-47, much to their discomfort in the turbulence over the mountains. That we found out from them the following day when we left for Tehran, our second night stop. On 3 June, it was on to Karachi for the conference and a formal dinner, to which the Argosy crew was invited — quite an honour.



ABOVE: The Kemble Argosy dump continued to fill up during the author's time on type. XR138 is the camouflaged example here.
BOB O'BRIEN COLLECTION

We departed on the 6th, via a flag stop at Tehran, to Ankara, then back to Akrotiri on the 7th. It had been a memorable trip, clocking up 23 hours 45 minutes over the week.

As we flew back, events were happening that would have significant effects on life in Cyprus. President Archbishop Makarios had been in dispute with the Greek junta over the presence of certain Greek military officers in Cyprus, and on 15 July 1974 a Greek-backed military coup ousted him. With fighting between pro-Greece and pro-Makarios forces going on across the island, the President fled, being rescued by an No 84 Squadron Whirlwind from Paphos and soon flown to England by the Argosy VIP crew. Five days after the coup, the Turkish Army invaded Cyprus, effectively amounting to armed conflict between Greek Cypriots and Turkey.

On LXX, the first we heard of the invasion was a message from station ops saying, "Nicosia is black" — the RAF airfield weather colour code meaning, "airfield unusable for reasons other than weather", in this case an invasion by Turkish paratroops. In short order, all RAF and army personnel not already on base were called in and an evacuation of service families living off-base organised, bringing them onto the two Sovereign Base Areas, the Akrotiri/Episkopi (HQ) SBA in the south and the Eastern SBA around Dhekelia and Ayios Nikolaos, to be billeted with other families in married quarters pending repatriation to the UK.

The squadron suddenly became busier than usual, with all available Hercules and the one Argosy, XP412, running a shuttle evacuation of mainly British tourists from the holiday areas around Famagusta and Larnaca via the Eastern SBA. We operated into Kingsfield, a small airstrip normally used by the Army Air Corps and the local gliding club, with a rather bumpy 4,000ft (1,250m) runway of rolled, oiled sand over crushed rock. The Argosy flew fitted with as many triple-seat units as possible, several times on my six runs between 23 July and 1 August carrying more than 100 passengers — the normal 'max-pax' load was 69. Thereafter, August was quiet for flying and the conflict was resolved, after two ceasefires, on the 18th. The resulting UN-monitored 'Green Line', east-west across Cyprus through Nicosia, remains, dividing Turkish Cypriots in the north from Greek Cypriots in the south.

> *"We carried more than 100 people; the normal maximum was 69"*

Unfortunately for me, September 1974's flying turned out to be almost my last with LXX at Akrotiri, as on 1 October — four years to the day since I had joined the RAF and the day before I was due to go back to the UK on leave — I was knocked off my motorbike and ended up in the RAF hospital on the base with an injured foot. A couple of weeks later, I was flown back to the UK on a stretcher in a medevac VC10 and transferred to the hospital at Halton for plastic surgery, eventually regaining my aircrew medical category and being posted back to No 115 Squadron. I did return to Akrotiri, however, to sort out my personal effects in January 1975, and while I was there was 'borrowed' for a one-day round trip with LXX to Ankara and Adana. My trip home to Cottesmore was in early February as supernumerary crew on XP412, which was as full of freight — squadron members' personal effects, including a small cabin cruiser and my bent

motorbike — as I had ever seen an Argosy!

This turned out to be the start of a progressive withdrawal from Akrotiri of all the resident squadrons except 84. It was largely due to the decision that CENTO's nuclear strike role could not be maintained from Cyprus after the Turkish invasion, and NEAF was ultimately disbanded in March 1976. LXX's Hercules moved with the squadron to join the Lyneham Wing, and Argosies XP412 and '450 flew back into retirement. The last Argosy to leave overseas service was thus XP444, C-in-C NEAF's personal aircraft, which was ferried out in November 1975.

Back on No 115 Squadron, work continued much as before, but with the additional highlight of a royal visit in June, for which the station put on a flying display. The event included a mixed formation flypast of two Argosies in line-astern with a Canberra on each side, a slightly unwieldy combination in view of the air speed differential. I was co-pilot on the lead aircraft and clearly remember one practice in which the visiting Vulcan ahead of us in the display ran a bit late. We were treated to a plan view of the 'tin triangle' as it performed its full-power rotation and steep climb-out only half a mile in front of us, followed by a hefty jolt as we hit his slipstream.

❖

An additional task which fell to 115 was the disposal flights for several surplus Argosies which were undergoing conversion as navigator, loadmaster and flight engineer trainers, a scheme cancelled in May 1975 as part of a range of defence cuts. I was on the crews which flew XR136 from Bitteswell to Kemble's 'fire dump' — a sad end — in July, and XP442 from Bitteswell to the grass airfield at Halton that October, for a more productive future. It joined two Vulcans and a Britannia in the hangars of No 1 School of Technical Training as a training airframe, 8454M, for the Halton apprentices. I thus became one of the few pilots to have 'Argosy T2' in their logbooks. The sole T1, and the only trainer to be repainted in Training Command colours, survives in the RAF Museum Midlands at Cosford. Otherwise it's identical to the C1, being intended as a type trainer, lacking the large radome and internal modifications of the T2.

This was not quite the end for the Argosy, as No 115 Squadron continued to fly it until January 1978 alongside the Andover E3 which was introduced to take over the flight checking role in late 1976. My time on the Argosy came to a conclusion earlier that year when, as part of a defence review, 115's fleet was reduced from nine aircraft to six and the squadron moved to Brize Norton. Three crews thus had to be found other posts, so two other co-pilots and I were transferred to No 242 OCU at Lyneham for conversion onto the Hercules.

My three one-year tours, accumulating just over 1,000 hours on the Argosy, gave me a lot of enjoyable flying and valuable experience. The Argosy may not have been the longest-serving RAF transport type, but it was robust and reliable, and its introduction marked the start of the turboprop tactical transport era for the air force.

BELOW: By the time XP448 was on approach to Brize Norton in April 1977, the Argosy E1 had less than a year to run with No 115 Squadron — which had transferred from Cottesmore to Brize during 1976 — as the Andover E3 took over. The squadron's final Argosy sortie was by XR413, between those two bases, on 22 January 1978.
ADRIAN M. BALCH

448
XP448
XP 448

JAVELIN SCHOOL

V
XA702
S
XA653
01
XH398
U
XH889

A trio of No 228 OCU Javelin FAW5s — XA702, XA663 and XH689 — lead T3 XH396 in a neat box-four circa 1961. The aircraft carry the emblem of No 137 Squadron, the OCU's 'shadow' identity while it was stationed at Leeming between 1956 and 1961.
KEY COLLECTION

It couldn't be looped, it slowed down if you engaged reheat at altitude, it was left behind by advances in Soviet defences which rendered its performance inadequate — but the Gloster Javelin was far from an outright failure. And learning to fly it with No 228 Operational Conversion Unit, near the end of the type's life, was a highly educational experience for a pilot fresh out of training **WORDS:** MARTIN SELVES

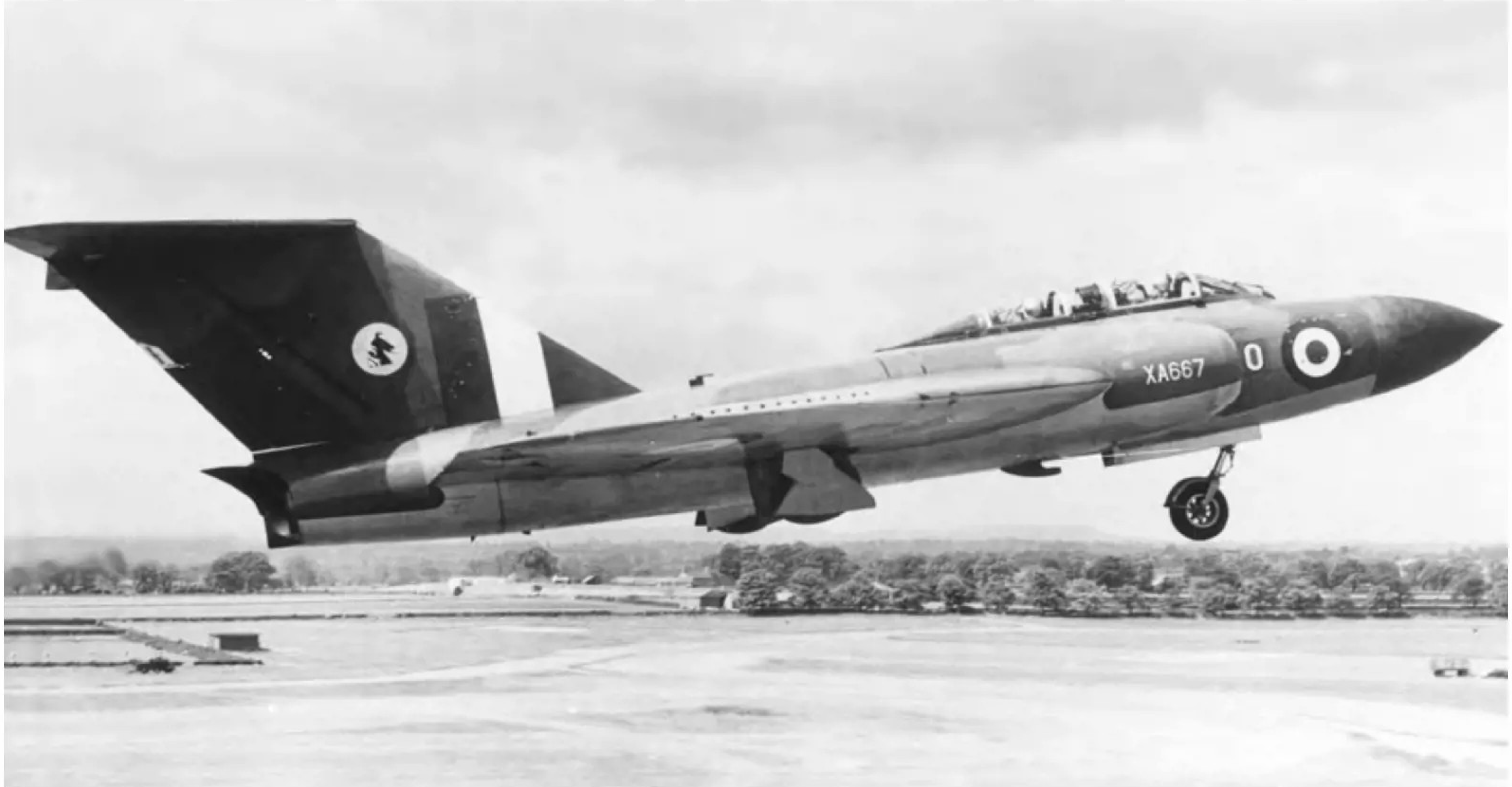
We were in the bar at RAF Valley when we were informed what our postings would be. "You're off to Javelins", I was told, but I knew nothing about them. The next day I drove to W. H. Smith's in Holyhead, bought the *Observer's Book of Aircraft* and looked it up. It said the aircraft was obsolete. Obsolete or not, it was nothing like the two aeroplanes, the Jet Provost and the Gnat, I had flown so far in any way at all.

First I was sent to North Luffenham, which was responsible for fitting and instructing aircrew in the use of partial pressure suits to keep the pilot conscious if cabin pressure was lost at high altitude. Our time there encompassed instruction and practical experience in hypoxia and exposure to the sudden explosive decompression of an aircraft cabin. We were 'banged' from around 30,000ft to 50,000, where we practised pressure breathing once the instant fog had disappeared. You didn't need to breathe in as the pressure was in your mask, and you had to control it into your lungs.

No 228 Operational Conversion Unit was at Leuchars in Fife, a long drive from Reading where I lived. My Borgward Isabella TS 75 would have failed the MOT in every way possible, but it got me safely to the officers' mess on 5 September 1966. It was also the home of Nos 23 and 74 Squadrons with their Lightnings, a type I never flew, but of which I was always in awe.

Mind you, the Javelin was quite impressive too. My first impression was that it was big and imposing. It had a presence, and the only way in and out was via a large ladder. It looked clumsy and ugly to me on the ground, but in flight, from some angles, it was a beautiful aircraft. Certainly, it was very potent with four ADEN cannon and four Firestreak missiles. It was quick to height and took only four minutes to reach 40,000ft where it started to run out of puff. During the next four months I was to learn how to fly it and become a day/night fighter pilot.

The bar in the mess took up a lot of our spare time, and within a few days we all assembled in it — around 16 students — to 'crew up' over a few beers. There I met Mike Bruce for the first time, and we decided to join at the hip. I chose well. Mike was extremely sharp and learned very quickly. We were a good team, and we stayed together



RIGHT: A formation take-off alongside Javelin FAW5 XA667 from Leeming during the spring of 1961. The OCU's first period on the Javelin ended that year.
VIA ANDREW THOMAS

on No 60 Squadron at Tengah for another 13 months after graduating from the OCU. Mike was destined for high rank, and he became commander of a Phantom squadron later in his career.

Both of us found the course quite easy and were able to enjoy the ride when others had problems. I think four pilots failed to finish it — one didn't even reach the runway on his 'chop ride' after he left the taxiway and went onto the grass. The Javelin had odd toe-brakes, with a time delay from brake application to effect. It was all too simple at first to over-control on the brakes and follow a zig-zag pattern.

Ground school took a few days. The aircraft was not complicated, but it did have some odd features. One concerned the undercarriage. If you pressed the 'up' button with more than 40lb of pressure, a pin entered the linkage — there was no warning light — and the gear could not be lowered on the normal system when you wanted to land. This happened to me in Singapore, at around midnight with little fuel after being struck by lightning, but that's a good tale for another time.

I flew 43 hours five minutes on the aircraft at Leuchars and 12 hours 20 minutes in the simulator practising interceptions. This was not a simulator as we know it today, but a basic Link trainer for the navigator to use rather than the pilot. While it was a gentle course, we had a lot to learn, particularly the navigators, who had to master the radar and learn key numbers for each interception. Later in our training the set-ups were random and not ideal, but Mike Bruce managed without much difficulty. Pilots had to obey instructions from the navigator and fly as accurately as possible. Standard calls on bank and speed changes from navigator to pilot needed to be flown smoothly and quickly, in order to manoeuvre safely behind the target aircraft. We closed up to 200 yards or so, and at night, over the sea at 1,000ft, believe me when I say 200 yards is *close*. You could see the red jet pipes glowing quite clearly.

We practised overshooting if things got hairy, and this happened for real one night when our overtake speed was very high. When I looked out during the procedure we were flying very, very close to our target. My instrument flying improved a lot over the four months, particularly at night when it was highly important.

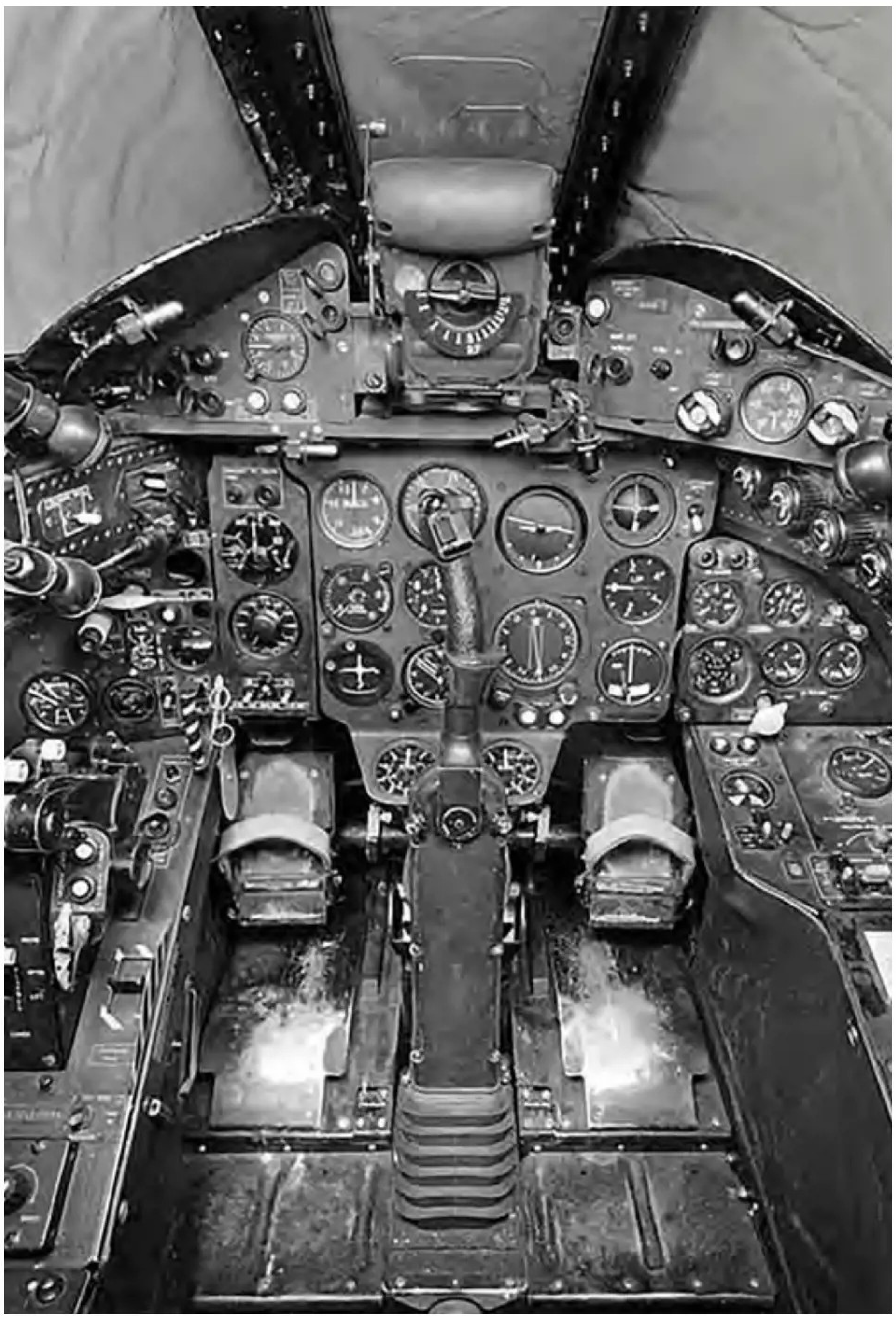
> ***"This was really a missile platform, and the Firestreak was impressive"***

Recording the interception when airborne was interesting. The navigator was told to transmit all the relevant radar angles and ranges, and instructions to the pilot from the start of the interception. The set-up was controlled by Boulmer radar. The more radio traffic the better, and the information and instructions were taken down in shorthand by an instructor navigator on the ground. After landing the instructor would debrief the student from his notes, and comments like, "you should have eased instead of hardened" became the order of the day. As odd as this might seem today, it worked well, but it was quite boring for the pilot to listen to. I think most of us drifted away after a while.

As the course progressed, the target was allowed to evade to make life harder for the navigator, with even bank reversals that would cause rapid range closure and the chance of an overshoot situation for the unwary. It was fun, but hard work and not a little dangerous at night, when low-level over the water.

Although the syllabus was designed around the navigator, the pilots had to learn their share of new tricks, too. Circuit-bashing was, naturally, important, but not that easy for the instructor in the back seat of the Javelin T3 who had little — if any — forward vision and had to use a binocular-type system to look forward, with the lenses either side of the front cockpit. For the first time we learned battle formation and rehearsed the turns on command from the formation leader at high and low levels. This skill we all used every day for the rest of our flying days.

One mission was to fly the Javelin supersonic. This was a difficult thing to do, and why would you want to? I failed. I could not get my aircraft to pass muster, and I did try hard. At the end of



On first acquaintance, the size of the pilot's cockpit impressed, and the layout was far from the worst in an RAF fast jet of the period.
VIA MARTIN SELVES

our training we fired our ADEN cannon over the North Sea. The trigger was big and clunky, and it took quite a squeeze to fire off the rounds. Later in my career I flew the Phantom, which would fire 100 rounds with the lightest touch. But the ADEN was a good, solid weapon.

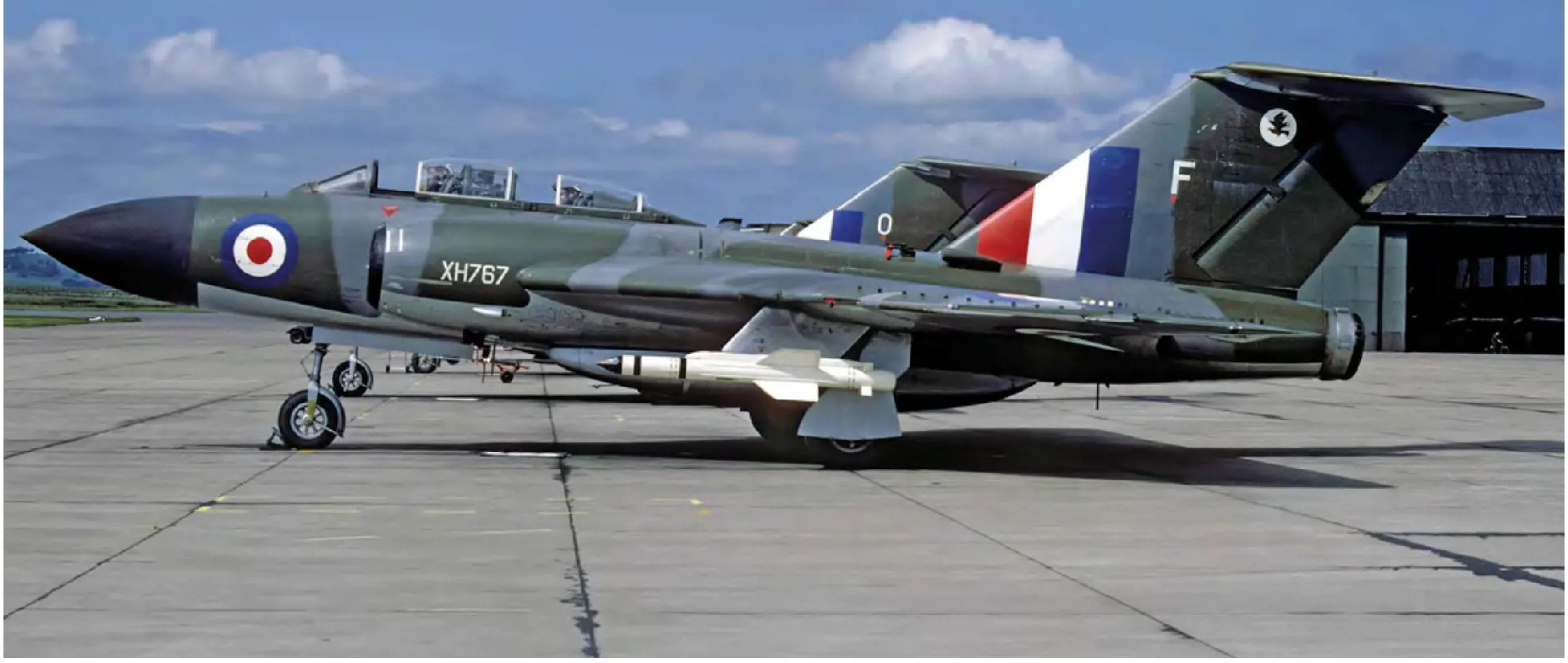
◆

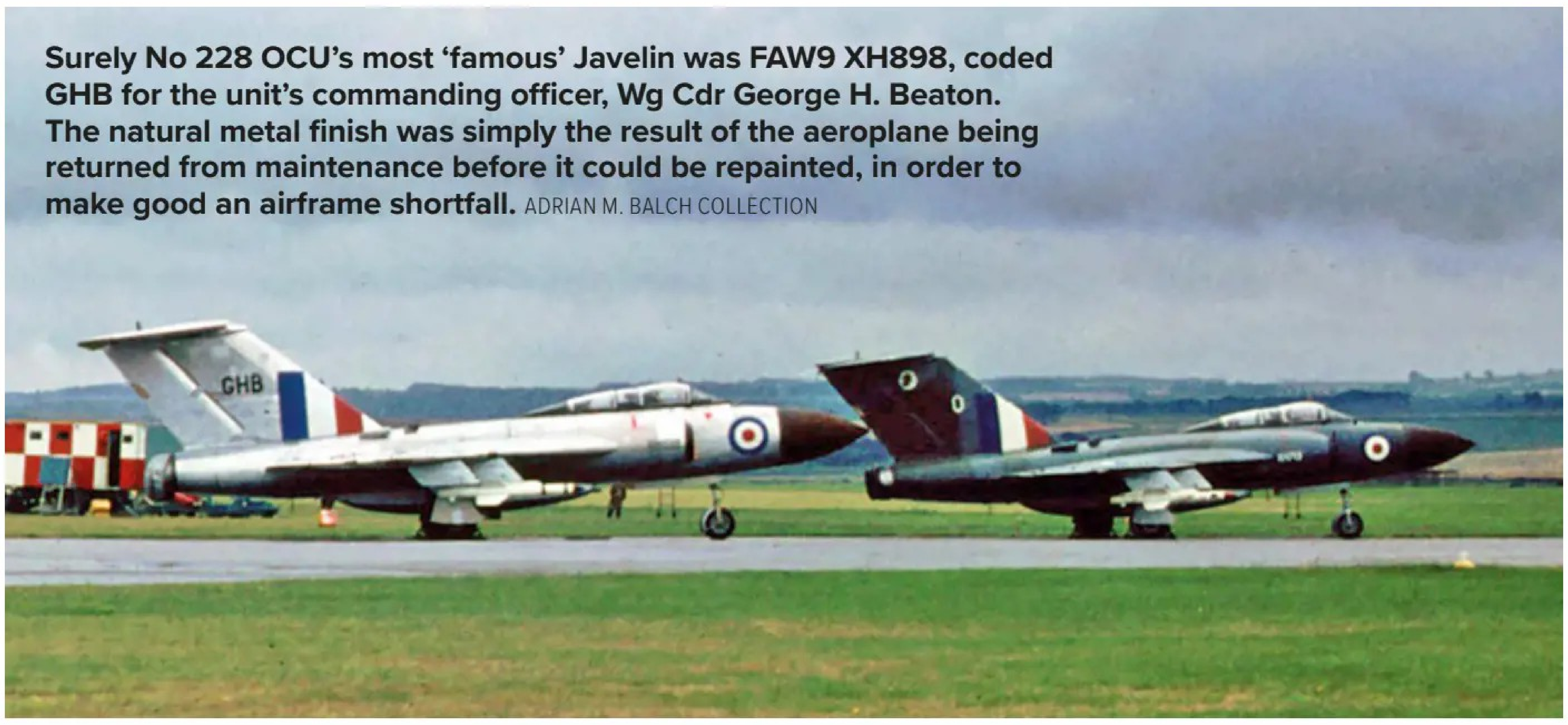
Overall, the Javelin was pleasant to fly. It certainly had lots of space inside, but the instruments looked so antiquated after the Gnat, while its rate of roll, turn performance and aerobatic capability were sedate, and stalling and loops prohibited. This was really a missile platform, and the Firestreak it carried was very impressive; the guns, if you could lay them on a target, were excellent too. The reheat on the Armstrong Siddeley Sapphire engines was useful above 20,000ft, but below that you actually slowed down when you engaged it. The fuel pumps could not deliver enough fuel for the engine and reheat together until you were down at medium level, something we trained to use tactically with the intention of frightening the enemy at low level. The long, yellow flame looked menacing to an insurgent on the ground, and it was employed in that way.

One outstanding feature of the aircraft was its airbrakes. They were so powerful it had a speed switch at 430kt, above which the system would only give half-airbrake. This was to protect the navigator from injury as the deceleration was truly magnificent. If the weather permitted, you could approach the runway at 20,000ft and call, "30 seconds to break". It helped to get the aircraft nose-down first, and then, with the airbrakes out, both pilot and navigator hung in their straps on this exciting ride down. Amazing. No other aeroplane could do this.

I enjoyed the OCU course. Ten or 12 flying hours a month was not exactly hard work, but it did produce some interesting memories nevertheless. One was a ride in the back seat of a T3. The captain was another student, and our job was to be a permanent target at night, at low level. All went well until we returned to Leuchars. A Lightning declared an emergency and we should have landed and got out of the way, but my friend decided to orbit, burning off fuel. Luckily the Lightning landed quickly without taking the barrier, and we prepared to follow suit. Sadly, my friend flew a very poor approach

A flightline of Javelin FAW9s at Leuchars in July 1966 is headed by the Firestreak-toting XH767. The unit had re-formed at the Fife base during May 1965, and at the beginning of 1966 took up the No 11 Squadron 'shadow' identity, hence the badge on the tail fin.
ADRIAN M. BALCH COLLECTION





Surely No 228 OCU's most 'famous' Javelin was FAW9 XH898, coded GHB for the unit's commanding officer, Wg Cdr George H. Beaton. The natural metal finish was simply the result of the aeroplane being returned from maintenance before it could be repainted, in order to make good an airframe shortfall. ADRIAN M. BALCH COLLECTION

and had to overshoot. He did this three more times. He had speed control problems and always flew through the centreline with lots of angles to go. With minimum fuel approaching, I suggested I looked after the speed control from the back seat and he did the rest. Even this went badly, but we did manage to touch down in the end. He found himself being 'chopped' a few weeks later.

Another problem occurred very early on, when I landed with a failed right-hand brake. I wasn't aware of this until I applied the brakes and ran onto the grass to the left of the runway. The rudder was very effective and I ended up where I should have been, on the centreline, wondering what to do next. My call ought to have been "Barrier", whereupon the net at the far threshold would have been raised, but I didn't think of this. I could have told the tower I had a problem, but I didn't do that either. Instead, as I neared the end of the runway, I applied my brakes — well, one brake — and went through at least 360° before it stopped. Help arrived, we climbed down our ladders and I had a look at a pool of liquid under the oleo leg. I put my finger in it, and burnt it up to the first joint. The rudder had saved my embarrassment.

I mention this in part because taxiing behind another Javelin gave a wonderful view of its huge vertical fin and stabiliser. It wobbled dramatically all over the place, and one had indeed detached from an aircraft a few years before, but the modification that followed made it safe.

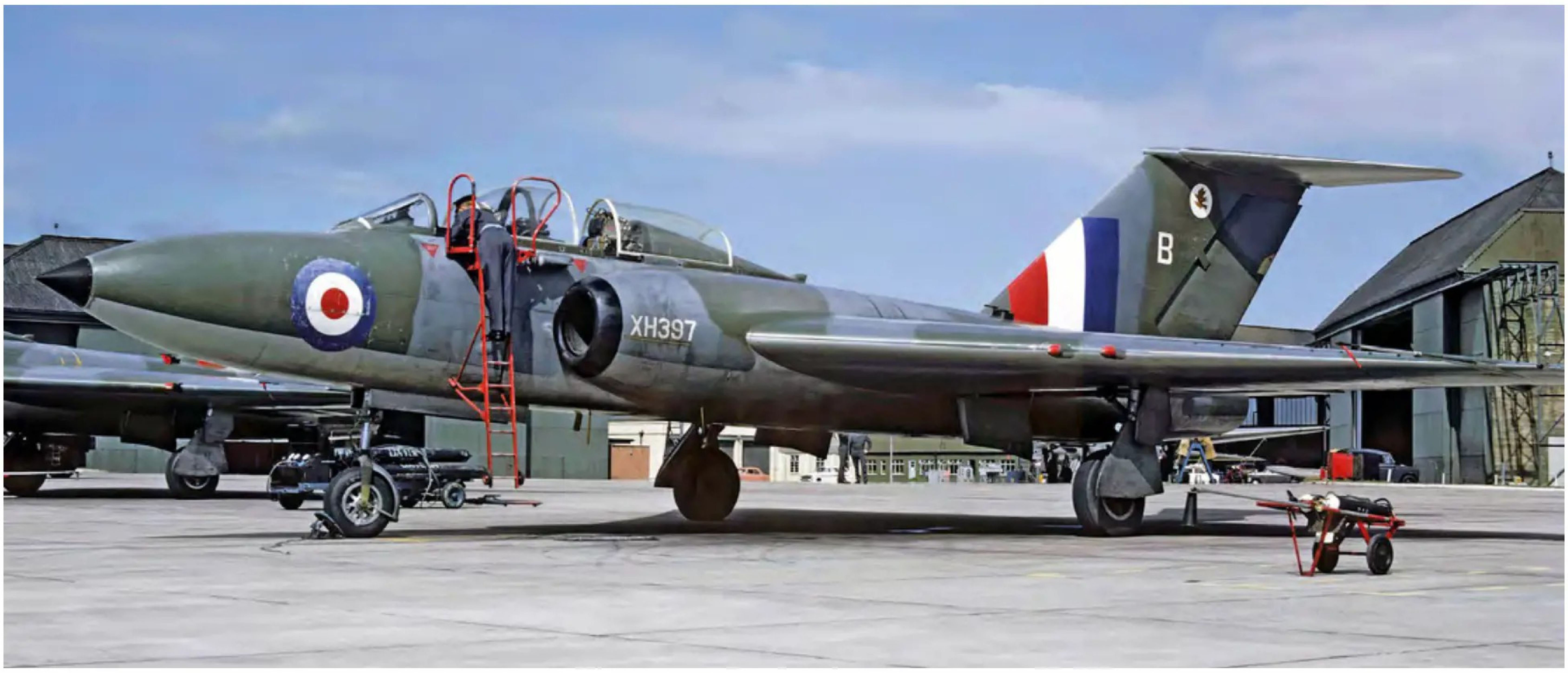
Early in October 1966, a friend had an engine fire on his first solo Javelin flight. The immediate actions included jettisoning the ventral fuel tanks, as they were directly beneath the engine. But he pressed a button instead of pulling a lever and jettisoned his wing-mounted store — a real Firestreak missile, less the warhead and propellant. It landed on St Andrews golf course, near the vertical, very close to the pin on the 18th green. What a hole-in-one that would have been. Many golfers putted around it that day thinking it was a university prank.

Engine problems were taken seriously. The aircraft did have a history of centreline closure, where the inside of the engine — the rotating bits — expanded more than the outer cowling, and quickly destroyed itself and the aircraft. Quite a few Javelins were lost in this way before the fault was found. It was solved by modifying the blade tips with a grinding surface that literally ground away material where they touched.

Nearing the end of our training, we were heading to the bar on a Friday night when a Javelin turned off the runway and taxied towards us. As it got near the instructor stood up on his ejection seat, smartly turned 90° left, saluted us and sat down. An extraordinary thing to do — he must have put his seat pins in first. This summed up our course. We had fun, it was near the end of an era, the instructors were excellent, no-one took things too seriously, yet standards were high.

In a few weeks' time, we were going to fly the Javelin in Singapore, right at the close of its useful life. I was only 20 years old, and life was great. We just had enough time to see our parents before we set off in a Britannia for a fantastic adventure half-way around the world. That time at Leuchars had prepared us well.

BELOW: The T3 trainer could most readily be distinguished from the front-line Javelins by virtue of its bulged canopy and lack of a radar. XH397 sits on the Leuchars line in July 1966; No 228 OCU disbanded there in late December of that year. ADRIAN M. BALCH COLLECTION



WIN! A LANCASTER BOMBER COMMAND EXPERIENCE

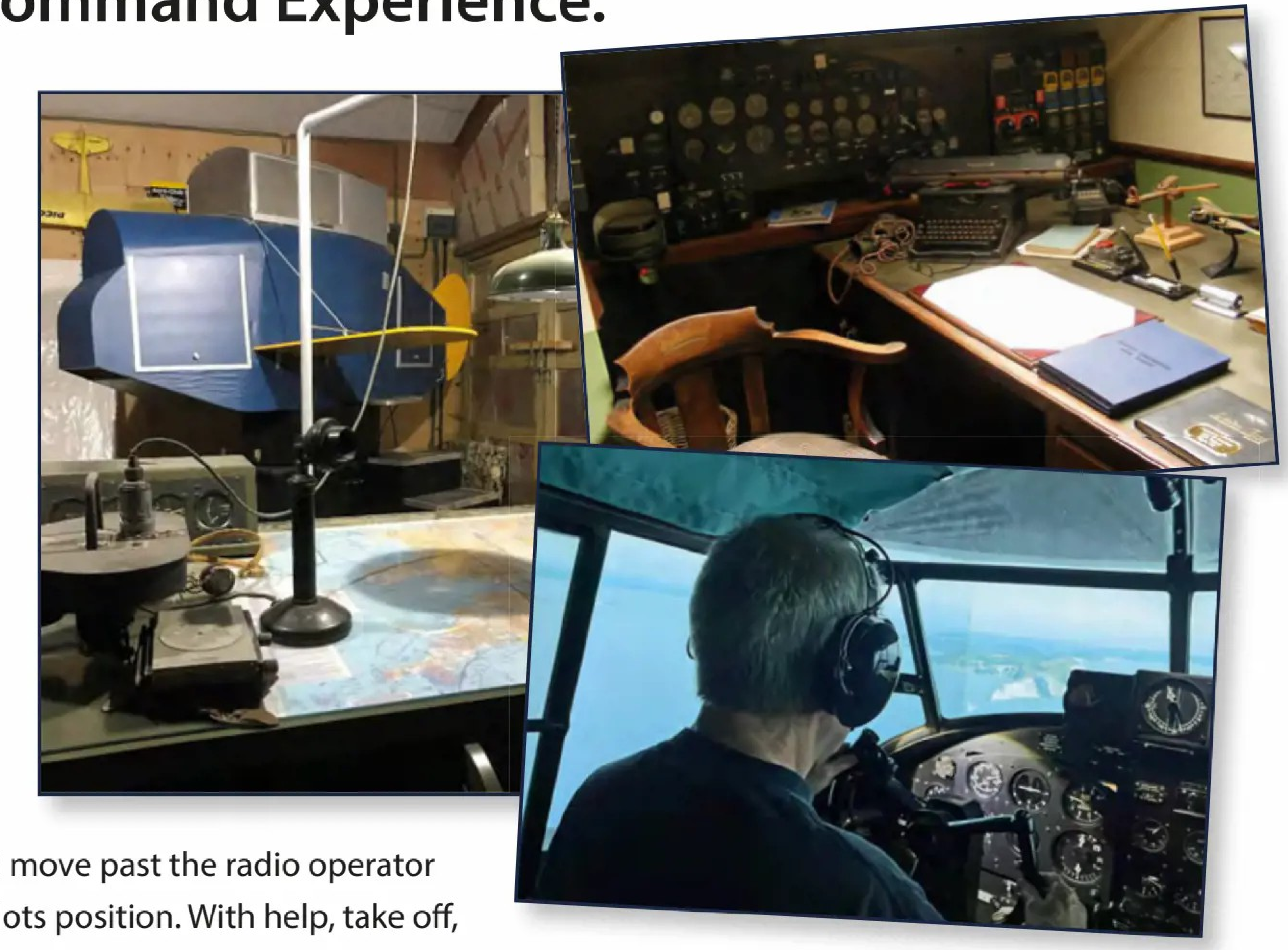
WORTH £495!

Flypast **and** ***Aeroplane Monthly*** **have teamed up with *Lancasterflightuk.co.uk* to give one lucky reader the chance to win a Lancaster Bomber Command Experience.**

Arrive at Cann in North Dorset, enjoy an introductory talk, over coffee, explaining the history of the project. Enter into another building and be taken back to 1943 wartime England and be totally immersed in the RAF Bomber Command in WW11.

Enter the briefing room, surrounded by wartime Air ministry artefacts and be briefed about what is going to happen.

Enter the Link Trainer room and view many bomber command exhibits before flying the Link Trainer.



Climb about the Lancaster Bomber, view and move past the radio operator and navigators stations until seated in the pilots position. With help, take off, fly a sortie around the Isle of Wight terminating in a low level bomb run along the Fleet and landing back at Hurn airfield. Take a break, then return to the pilots seat and fly from RAF Scampton on the first leg of a WW11 bombing run terminating over the North sea.

All this in the only 464 provisioning Lancaster, set up as such, worldwide, with working gauges and full immersion graphics. You will fly with a flight instructor as a Flight Engineer next to you so no previous flying experience required.

> "What an amazing privilege to be among the first to see your astonishing brilliant creation. A stunning feat of engineering in its own right. I cannot thank you enough, I am truly gob-smacked, a superb tribute to all those who flew with RAF Bomber Command."

> "On the night of 16/17th May I was privileged to be asked to act as navigator in your Lancaster simulator"

To enter, scan the QR code to visit www.key.aero/competitions and fill in the online competition entry form.

Closing Date: 5th June 2025. Winners notified 16th June 2025. No purchase necessary. There is no cash prize alternative and the Editor's decision is final. Travel and accommodation costs are not included. The competition is not open to employees of Key Publishing or their families. The promoter is neither responsible nor liable for any change in value of a prize occurring between publishing date and the date the prize is claimed. Key Publishing will not be liable for any prizes which are lost, delayed, or damaged in the post for reasons beyond Key Publishing's control. Unless expressly stated for a particular promotion, promotions are restricted to entrants aged 18 years or over. If you are under 18 years of age, please ask a parent or guardian to enter their details on your behalf. Proof of eligibility must be provided on request. Only one entry per person is permitted. This competition is subject to the laws of England and Wales, any claims will be regulated by the courts of England and Wales.

Want to know more? Visit **www.lancasterflightuk.co.uk**

TO RUSSIA WITH LOVE

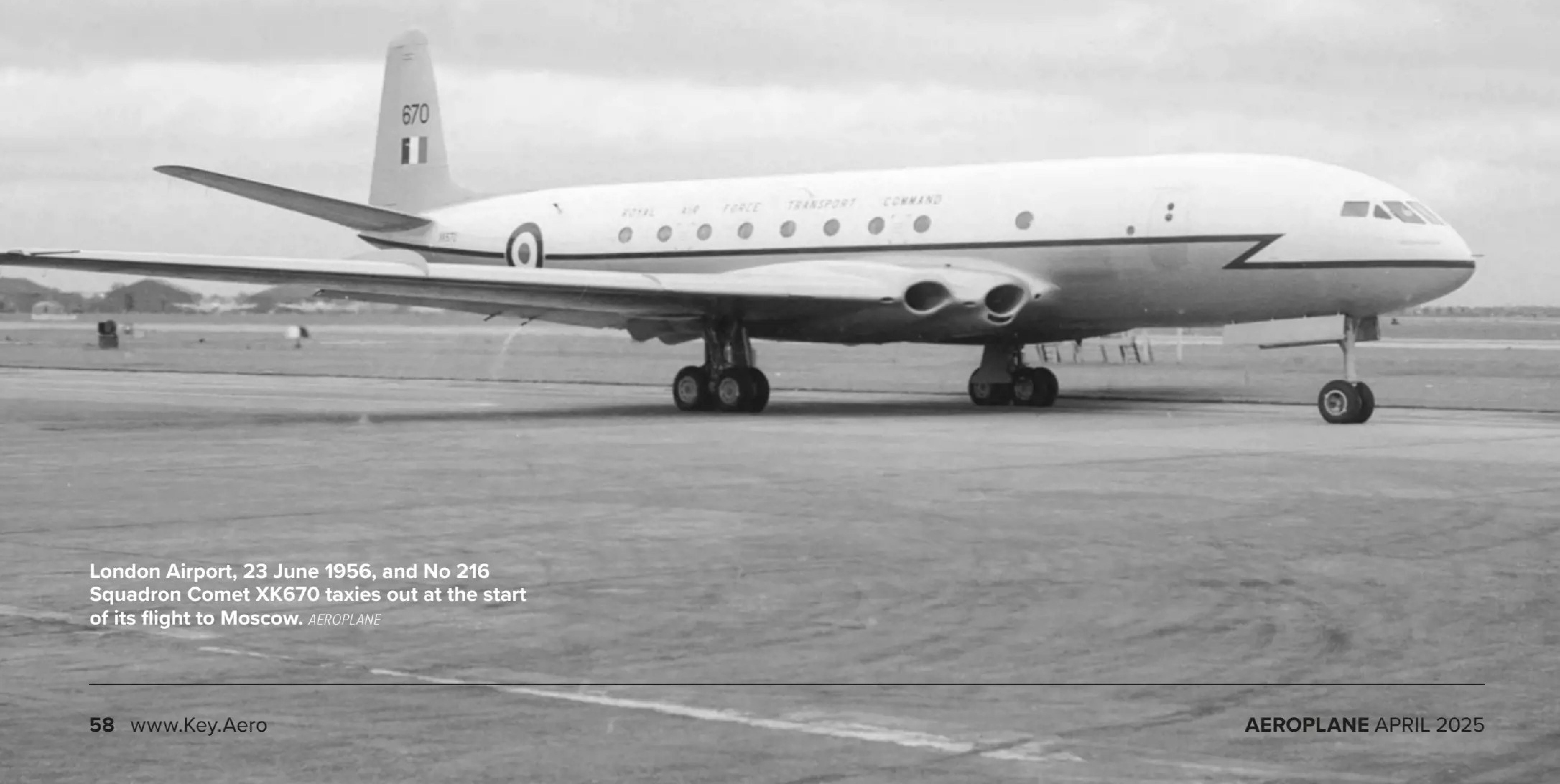
The de Havilland Comet 2's first mission for the RAF was conducted firmly in the glare of global publicity: transporting a senior party to Moscow for a view of the Soviet Union's latest air power capabilities. As the archives show, it proved to be a fascinating occasion **WORDS:** BEN DUNNELL

A goodwill visit to Moscow by one of the RAF's newest aircraft, its purpose to see the latest Soviet Air Force types in action, conducted in a spirit of fraternal respect. Belongs to another age, doesn't it?

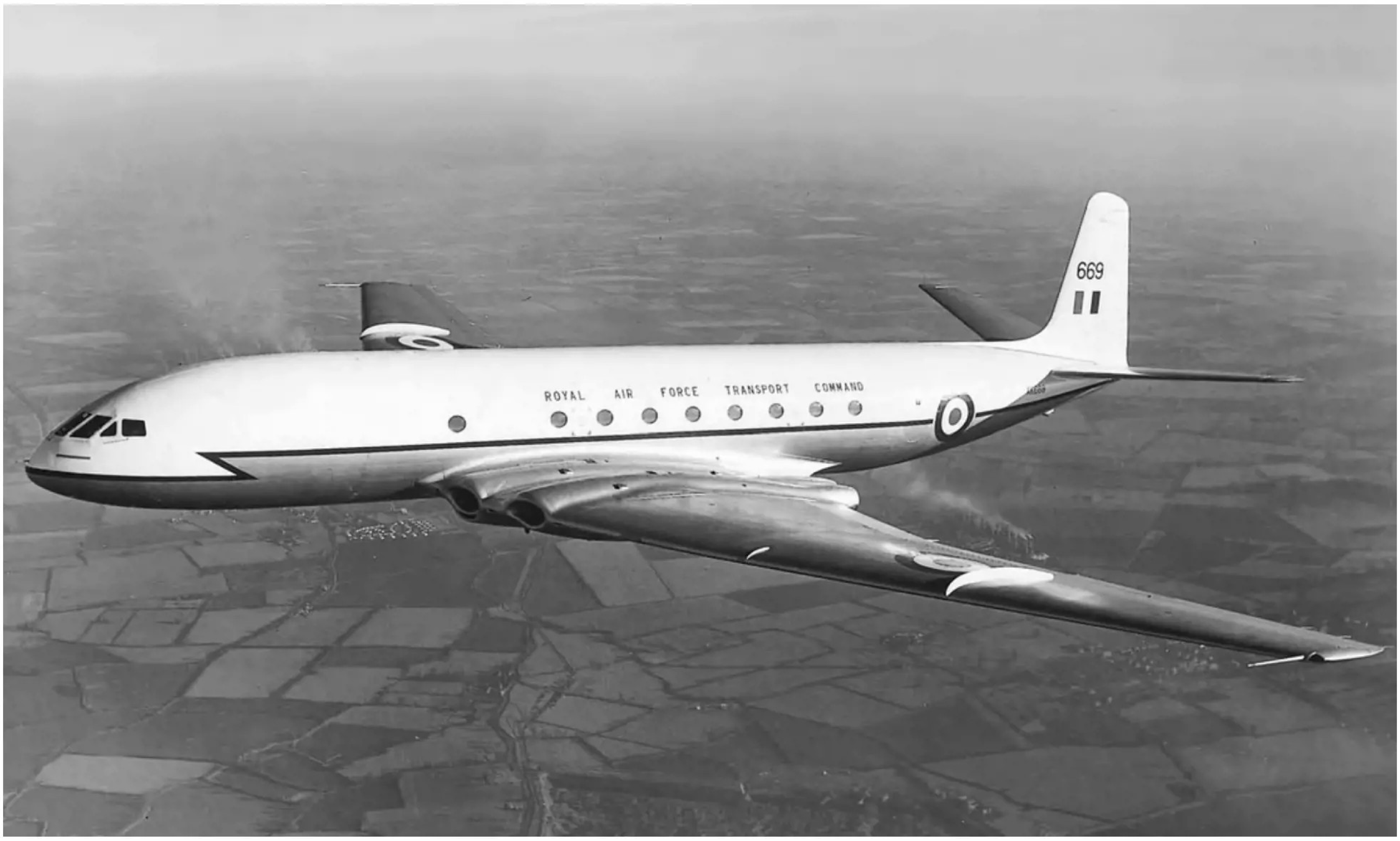
Yet even in 1956 it might seem, well, surprising. This was the year when the defection of Guy Burgess and Donald Maclean, two members of the Cambridge spy ring, became publicly known. It also saw the mysterious disappearance of MI6 frogman 'Buster' Crabb, sent underwater in Portsmouth harbour to gather intelligence on the cruiser *Ordzhonikidze*, which had brought Soviet leader Nikita Khrushchev and prime minister Nikolai Bulganin to Britain. Hardly a moment where maintaining a pretence of friendly relations would be high on the agenda, one might think.

But the backdrop was more nuanced. February's 20th Congress of the Soviet Communist Party had witnessed a speech by Khrushchev in which he outlined a new foreign policy. He called it "peaceful co-existence" with the west. The break with the doctrine laid down by his predecessor Stalin caused tensions within the Soviet bloc, most violently embodied by the autumn's Hungarian uprising. Given, not least, how Moscow now had a working hydrogen bomb and was developing an intercontinental ballistic missile capability, the peaceful overtures rang hollow. But they led directly to Khrushchev and Bulganin's unprecedented UK visit, during which — on 23 April — they travelled by British European Airways Viscount to RAF Marham.

Talking afterwards, Foreign Secretary Selwyn Lloyd asked for the leader's thoughts. "Mr Khrushchev said that he was not altogether satisfied with his aerodrome visit", recounted a secret internal memo. He complained about being "shown obsolete fighters" — Hunters, in a four-ship aerobatic team and a 24-ship flypast —



London Airport, 23 June 1956, and No 216 Squadron Comet XK670 taxies out at the start of its flight to Moscow. *AEROPLANE*



ABOVE:
A pre-delivery test flight by Comet XK669. Both this and XK670 were designated as Comet T2s, reflecting their primary use on crew training rather than operational transport duties.
KEY COLLECTION

"which were no longer considered as armaments". The Valiants, Khrushchev opined, "were new and good", whereupon Lloyd informed him "that they were not our latest". Despite the inevitable frostiness, a reciprocal invitation ensued. And this was where the Comet came in.

Nigel Birch was Secretary of State for Air in Anthony Eden's Conservative government. On 4 May 1956 he wrote to Foreign Office minister Anthony Nutting, saying, "When Bulganin and Khrushchev visited RAF Marham they invited me and certain senior Royal Air Force officers to visit Russia to see their Air Review. They said that we had only to point to a hangar and they would show us what was in it!" The idea, Birch added, had also been put to Eden himself. "I am advised by my Air and Intelligence staffs that we might get value from a visit of this nature. We would not only see the performance of their aircraft and equipment but we would also gain some idea of their efficiency in the air and on the ground. Our Air Attache in Moscow has never visited anything more exciting than a training airfield. We cannot lose on a basis of reciprocal visits and we may well gain quite a lot."

LEFT:
Nigel Birch (right), the Secretary of State for Air, with Col Konstantinov, the Soviet air attaché to London, before boarding the Moscow-bound Comet.
AEROPLANE

Later that month the Soviet air attaché to London went to see Birch and extended the offer on a formal basis. Bulganin was inviting the Secretary of State and 15-20 RAF officers to the display at Tushino — the annual Soviet Air Force Day — on 24 June, as part of an eight-day stay paid for by Moscow. It was decided to accept, and there could really only be one way to travel.

Given how the Soviet leaders' visit had been supported by a number of Aeroflot Tupolev Tu-104s, it was a matter of prestige for Britain not to look inferior. The Comet was still not back in airline service after the disasters of 1953-54, but the modified, improved Comet 2 was on the cusp of joining the RAF inventory. Pilots from No 216 Squadron at Lyneham had been receiving jet instruction in two loaned Meteor T7s and the Canberras of No 231 Operational Conversion Unit at Bassingbourn, while air and groundcrews were detached to de Havilland's Hatfield plant for conversion to the four-jet transport.

With "no difficulty" expected by the Vice Chief of the Air Staff, ACM Ronald Ivelaw-Chapman, in gaining a certificate of airworthiness, the RAF's first Comet 2s, XK669 and XK670, were set for hand-over at the beginning of June. "I have agreed", said Ivelaw-Chapman, "that one of these aircraft will be made available for the journey and the other will be held in reserve". A first pilot and flight engineer provided by de Havilland would "be temporarily embodied" as RAF officers, the rest of the crew being drawn from Transport Command. The joint announcement of the Moscow visit and the use of the Comet made for a double publicity whammy.

Both aeroplanes were detached back from Lyneham to Hatfield for three weeks before the flight, enabling an intensive training programme of 25 flying hours. With such a high-profile mission, nothing could be left to chance. No 216 Squadron's commanding officer, Wg Cdr Boyd Sellick, would be captain; the first pilot's role was filled by de Havilland test pilot Peter Bois, commissioned for the occasion into the RAF Volunteer Reserve with the rank of squadron leader. His colleague, flight engineer Leslie Young, likewise became an RAFVR flying officer.

Whichever Comet wasn't selected to fly to Moscow was earmarked as a back-up. But a separate invitation from the USSR's Minister of the Aircraft Industry to Minister of Supply Reginald Maudling meant there would be a second British party in attendance. Andrei Tupolev, the man behind the eponymous aircraft design bureau, had met Maudling and requested the attendance at Tushino of specialists from British manufacturers, specifically including Bristol's Sir Archibald Russell and Dr Stanley Hooker, though the latter ended up being unable to go. Just over a week before the scheduled departure, the Ministry of Supply asked whether, "in the last resort", they might have use of the other Comet. In the event, they made their way by scheduled airline, returning in a Viscount 748D destined for Central African Airways but provided by Vickers.

> ***"Four or five glasses of vodka before dinner are quite innocuous"***

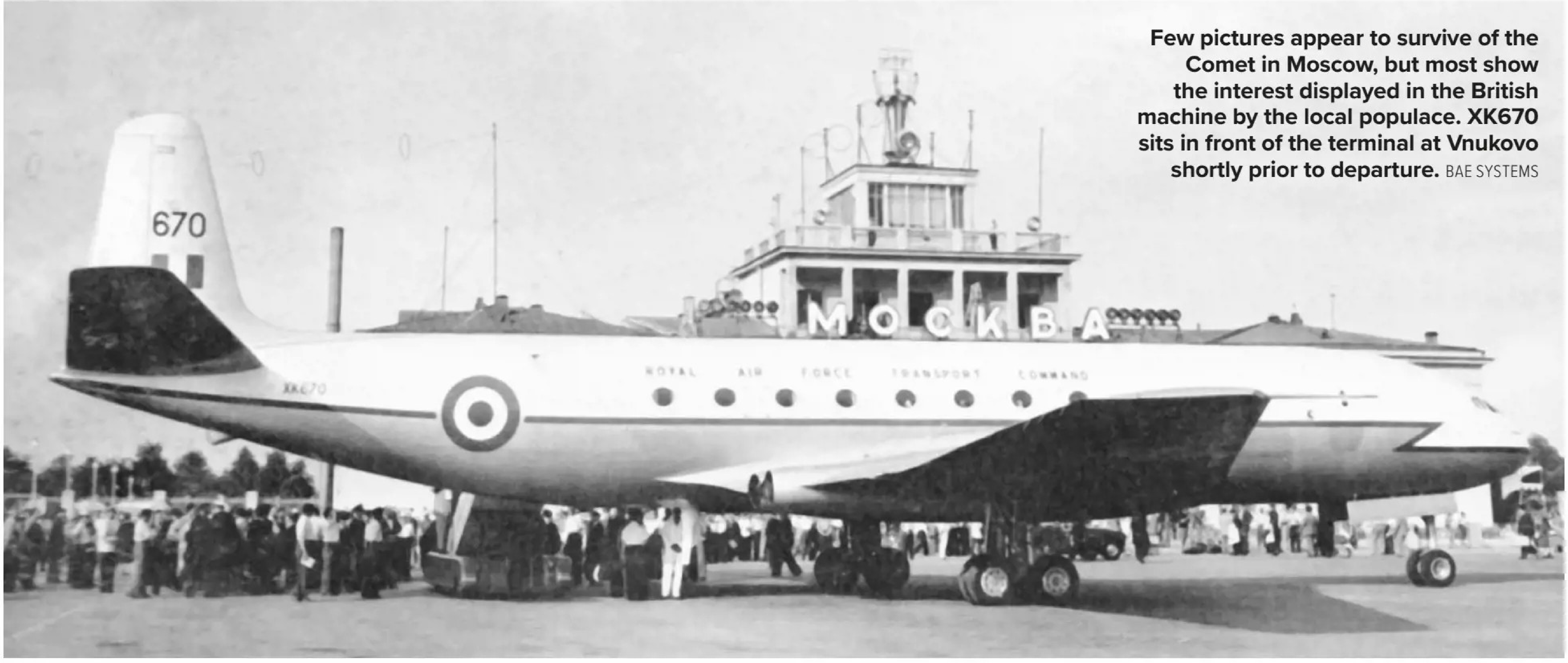
Plenty of official advice was dispensed to the RAF visitors, perhaps most importantly on 'Russian hospitality'. "To drink Vodka one must eat something after every glass", said one document. "The experts consider that four to five glasses before dinner are quite innocuous, if sufficient food is eaten at the same time. Vodka mixes quite safely with white wine and champagne but not with red wine. On no account should vodka be sipped. The Russian practice is for receptions and parties to start very late and last until the early hours of the morning; it is usually an offence if guests leave unreasonably early, say before 2 a.m."

So it was that the whole party gathered at Hatfield on 21 June for security and technical briefings, and a specific aircrew brief. Comet XK670 was pre-positioned to London Airport and loaded with 10,000 cigarettes — "I couldn't get the full quantity", bemoaned the Secretary of State's personal air secretary — and 50 cigars, plus a dozen bottles of whisky and a dozen more of gin.

The 11-strong crew and the passengers followed on the morning of 23 June, embarking at Heathrow's north terminal VIP facilities. It was a small but select group: aside from Nigel Birch, the RAF delegation was headed by Ivelaw-Chapman and Deputy Chief of the Air Staff Air Marshal Sir Thomas Pike, accompanied by six senior officers representing different groups and commands, two of their staff members and three service interpreters. With them and two press representatives was the Soviet air attaché to London, Col Konstantinov; the ambassador, Yakov Malik, was there to see them off. The doors were closed once Birch was aboard and the Comet headed the short distance to the runway. At 11.25, Sellick and Bois powered up the

BELOW: Doors closed, the pristine XK670 is ready to go.
AEROPLANE

670
ROYAL AIR FORCE TRANSPORT COMMAND
XK670
RLINES



Few pictures appear to survive of the Comet in Moscow, but most show the interest displayed in the British machine by the local populace. XK670 sits in front of the terminal at Vnukovo shortly prior to departure. BAE SYSTEMS

four Rolls-Royce Avons and XK670 was away on a history-making flight: the RAF's first operational jet transport sortie.

Before too long the Comet was established at its 39,000ft cruising altitude. There, over West Germany, a dozen Hunters stationed at Oldenburg appeared to provide 20 minutes' worth of ceremonial escort, six off each wing. It was necessary to use the Berlin and Warsaw air corridors, just like every other flight by a western aeroplane, which added 400 miles to the route. Reaching USSR airspace, the two Soviet navigators who'd been co-opted into the crew had their part to play. They and Konstantinov assisted in making a controlled descent towards Moscow.

The destination was Vnukovo Airport, south-west of the city centre. Following a straight-in approach, XK670 touched down to conclude a four-hour two-minute flight. It taxied to the terminal building, "which", said the report in de Havilland's employee magazine *Enterprise*, "was packed with people staring and pointing at this strange visitor". Alongside was the Douglas VC-118A which had brought Gen Nathan F. Twining, the US Air Force chief of staff, and his party. Close by, and making for an interesting comparison with the British jet, was a Tu-104.

As Birch disembarked, the welcoming committee was headed by deputy defence minister Marshal Ivan Konev and Marshal of the Air Force Pavel Zhigarev, commander-in-chief of the Soviet Air Forces. They had the first chance to look over the RAF's latest asset. But as the VIP party made by road to the Sovietsky Hotel in central Moscow, what *Enterprise* called, "a less formal and completely

A sprightly climb-out by the Comet from Heathrow. At the time, the de Havilland airliner was a stranger to the airport, being still to return to commercial service.
AEROPLANE

TUSHINO 1956: THE PROGRAMME

Part 1: DOSAAF

1. Nineteen banner-towing Yak-12 'Creeks'
2. Seventy-seven Yak-18 'Max' trainers spelling out the Cyrillic script for "Glory to the CPSU" (Communist Party of the Soviet Union)
3. Glider aerobatics, released from Yak-12
4. Winch-launch of three MAK-15 gliders, then aerobatics
5. Display of seven Yak-18s flown by women
6. Aerobatics by 21 Yak-18s

Part 2: Air Force

7. Solo jet fighter aerobatics by MiG-17 'Fresco'
8. Solo jet fighter aerobatics by MiG-19 'Farmer' with smoke
9. Four-ship jet fighter aerobatics by MiG-19s with smoke
10. Five-ship jet fighter aerobatics, probably by MiG-19s
11. Synchronised aerobatics and air combat demonstration by two flights of three MiG-17s
12. Nine-ship jet fighter aerobatics by MiG-17s
13. Bomber flypasts: four Tu-95 'Bears' including one with two MiG-17s as escort, three M-4 'Bisons', nine Tu-16 'Badgers'
14. Jet fighter flypasts: 50 Yak-25 'Flashlights', 60 MiG-19s
15. Tu-104 'Camel' and An-8 'Camp' transport flypasts
16. Flypasts by new jet aircraft: two Yak-25 variants, "one with pointed radar nose and one a bomber version", the latter being the Yak-26; the Mikoyan Ye-2, Ye-4 and Ye-5 prototypes of what became the MiG-21 'Fishbed'; the Sukhoi T-3, forerunner of the Su-9 'Fishpot'; and the Sukhoi S-1, prototype of the eventual Su-7 'Fitter'

Part 3: Paratroops

17. Six paratroops jumping from Il-12 'Coach'
18. Three paratroops jumping from An-2 'Colt', "with change of parachutes in the air"
19. Thirty paratroops jumping from five An-2s
20. Flypast by 36 Il-12s, unable to drop paratroops due to wind strength; airborne assault from 36 Mi-4 'Hound' and four Yak-24 'Horse' helicopters, unloading of 164 troops, guns and vehicles

spontaneous inspection of the aircraft began — this time by the ordinary Muscovites, some of whom had waited for hours at the airport.

"The crew watched a little nervously as hundreds of people, many of them women, swarmed all round the aircraft. A long queue of smiling, good-humoured comrades quickly formed up near the gangway". Sellick, "with the help of an airport official, took batches of ten into the aircraft and showed them the cabin interior and the cockpit. This went on for nearly an hour but, to the obvious relief of the crew, ended when the Comet had to be moved to dispersal to make way for the arrival of the French delegation's aircraft."

Dinner, an outing to Red Square and "a ride on the Metro with visits to the more ornate stations", occupied that evening. The next day, 24 June, the serious business began. By 09.55 the British group had been ushered to its vantage point on the roof of a building at Tushino, Birch being located elsewhere with the other heads of national delegations to the event. In all, said an official Air Ministry account, 27 countries were represented.

> *"A long queue of smiling comrades formed up near the gangway"*

The public was there en masse, too. Dr Walter Cawood, director general of scientific research (air), was part of the Ministry of Supply delegation. He wrote, "This display clearly arouses great enthusiasm amongst the population. I was awakened at about 0430 hours on Sunday morning by a general background of street noises and on looking out of the window found the main street crowded with young men and girls walking in the same direction, in long lines, with arms clasped, and either singing or playing concertinas. I gathered later that these were the people who had come some distance to see the show and that since there is little or no cheap overnight accommodation in Moscow, they had to fill in time on the streets. They all seemed to be enjoying it thoroughly, after the manner of an English Cup Tie crowd."

Rain was falling as a 20-gun salute and the playing of the state

"KHRUSHCHEV SUCCEEDED IN INSULTING PRACTICALLY EVERYONE"

So much for friendly relations. On 24 June 1956 the British ambassador to Moscow, Sir William Hayter, bore witness to an official function that rather gave the lie to "peaceful co-existence". He cabled London the next day, saying, "There were some rather extraordinary scenes at a party given by Marshal Zhukov last night for the delegations to the air display. Foreign correspondents were present throughout, but I am not sure how much they will have been able to report.

"At a fairly late stage in the evening the whole Presidium sat down at a table with the Secretary of State for Air, the VCAS, General Twining, the head of the French Air Force, various Soviet Marshals, the United States and French Ambassadors and myself. Khrushchev and Bulganin seemed to have set themselves the task of winning the confidence and friendship of the three western delegations, but they were too drunk to carry this off, and by the end of the evening Khrushchev in the course of several rambling speeches had succeeded in insulting practically everyone.

"He began by saying that only great Powers counted; smaller Powers though very nice had no responsibility. Later he said that the United States and the USSR were the only two countries that really mattered. He said that in the United Kingdom he and Bulganin had only been shown the Canberra bomber which Tupolev had told him was obsolete, that at Marham they had been too far away to see anything, and that when Tupolev was taken round an aircraft factory he had been hustled past all objects of interest. He said France was too poor to make an atom bomb. He said the Soviet Government had decided to show the United States delegation nothing of their guided missile development until they had been shown American aircraft. He proposed a toast to President Eisenhower but added that, though he respected the President, he had 'no respect at all' for several unnamed members of his immediate entourage. He also proposed a toast to China, coupling it with rude remarks about Chiang Kai-shek and the folly of those who failed to recognize Peking.

Soviet leader Nikita Khrushchev and defence minister Marshal Georgi Zhukov with USAF chief of staff Gen Nathan F. Twining on 24 June 1956, before the less-than-diplomatic dinner. GETTY

"Bulganin though more obviously drunk than Khrushchev did his best to soften the edges of all this. He stood up once or twice while Khrushchev was speaking but Khrushchev made him sit down. When he finally got the floor he proposed a very enthusiastic toast to the Prime Minister and a less effusive one to MM Mollet [the French premier Guy Mollet] and Pineau [Christian Pineau, the French foreign minister], and made a maudlin speech in honour of the United States armed forces.

"While this exhibition was going on the other members of the Presidium sat silent and embarrassed. Malenkov, Mikoyan and Pervukhin looked particularly displeased, and finally took steps to bring it all to an end by not sitting down at the end of one of Khrushchev's speeches. Kaganovich said to Molotov across Mrs Bohlen [wife of the US ambassador] 'all this is very unnecessary'. Zhukov took no part at all."

ROYAL AIR FORCE TRANSPORT COMMAND
41 AN02

ABOVE: **Of the RAF's first two Comets, XK669 was held in reserve at Hatfield for the Moscow mission, but was called upon to make the return visit on 3 July as a means of picking up the remaining members of the RAF party and demonstrating the aircraft to the Soviets.** KEY COLLECTION

anthem declared the 1956 Aviation Day display open at 10.00. Over the next hour-and-a-half, there appeared over the grass aerodrome in Moscow's north-western suburbs no fewer than 376 aircraft and helicopters, most flying from other locations, and gradually benefiting from an improvement in the conditions. The descriptions by the British observers are generally of like mind: the RAF intelligence report, for example, referred to, "strict timing and accurate flying of a safe, perhaps not very ambitious, character". Some of the aerobatic routines were, it was noted, performed by pilots with multiple previous Tushino displays to their credit.

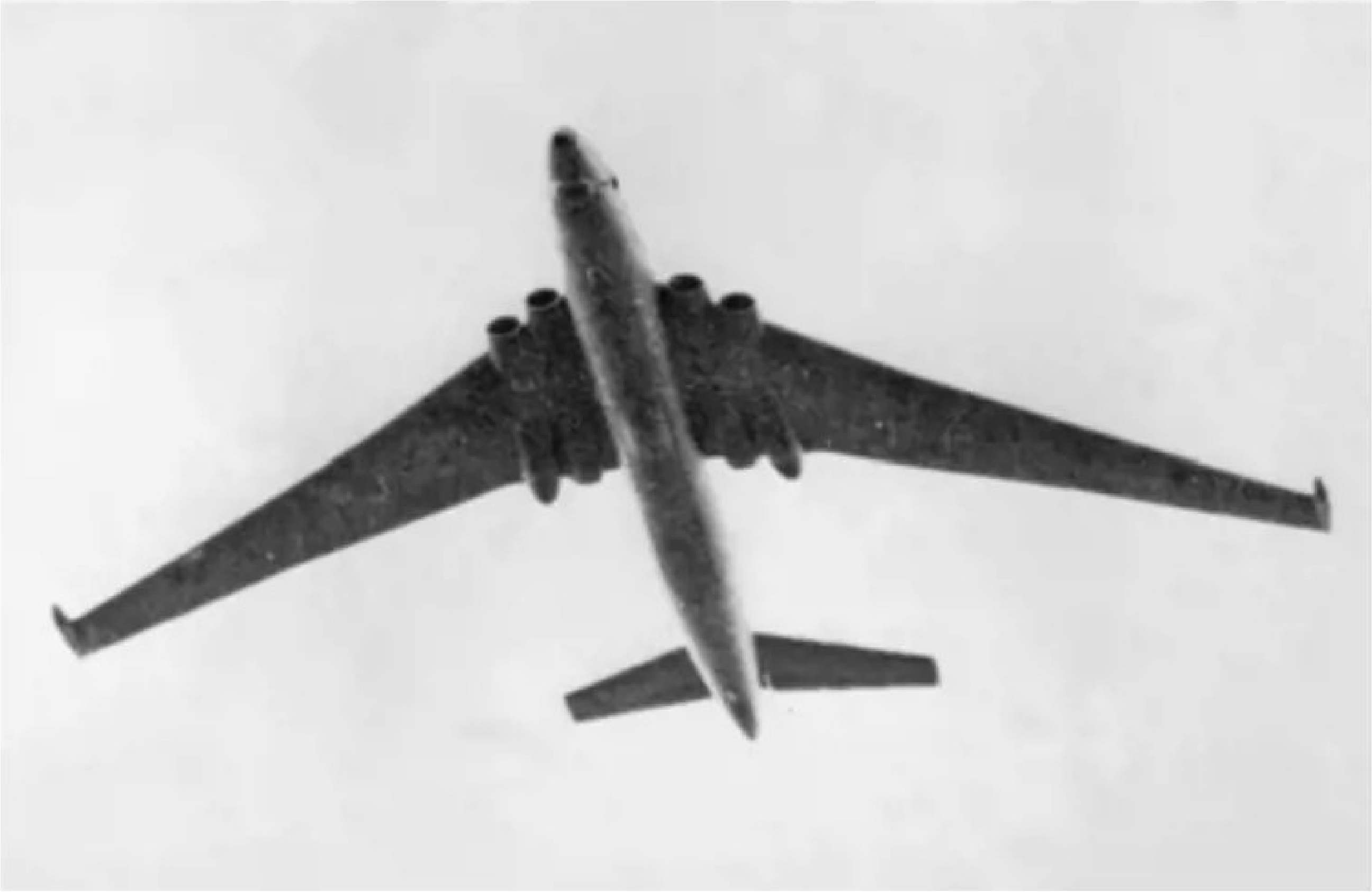
What of the new aircraft? Of those there were several, their provenance and designations then still unknown. Subsequent reviews in the western aeronautical press were often similarly confused. Most significant, with hindsight, were debuts by Mikoyan's latest fighter prototypes, the swept-wing Ye-2 and the delta-wing Ye-4 and Ye-5, all of which led on to the MiG-21. Likewise there were two fresh designs from Sukhoi, the S-1 later becoming the Su-7 'Fitter', while the delta T-3 was a precursor to the Su-9 'Fishpot'. Antonov's An-8 twin-turboprop transport was first-footing, too.

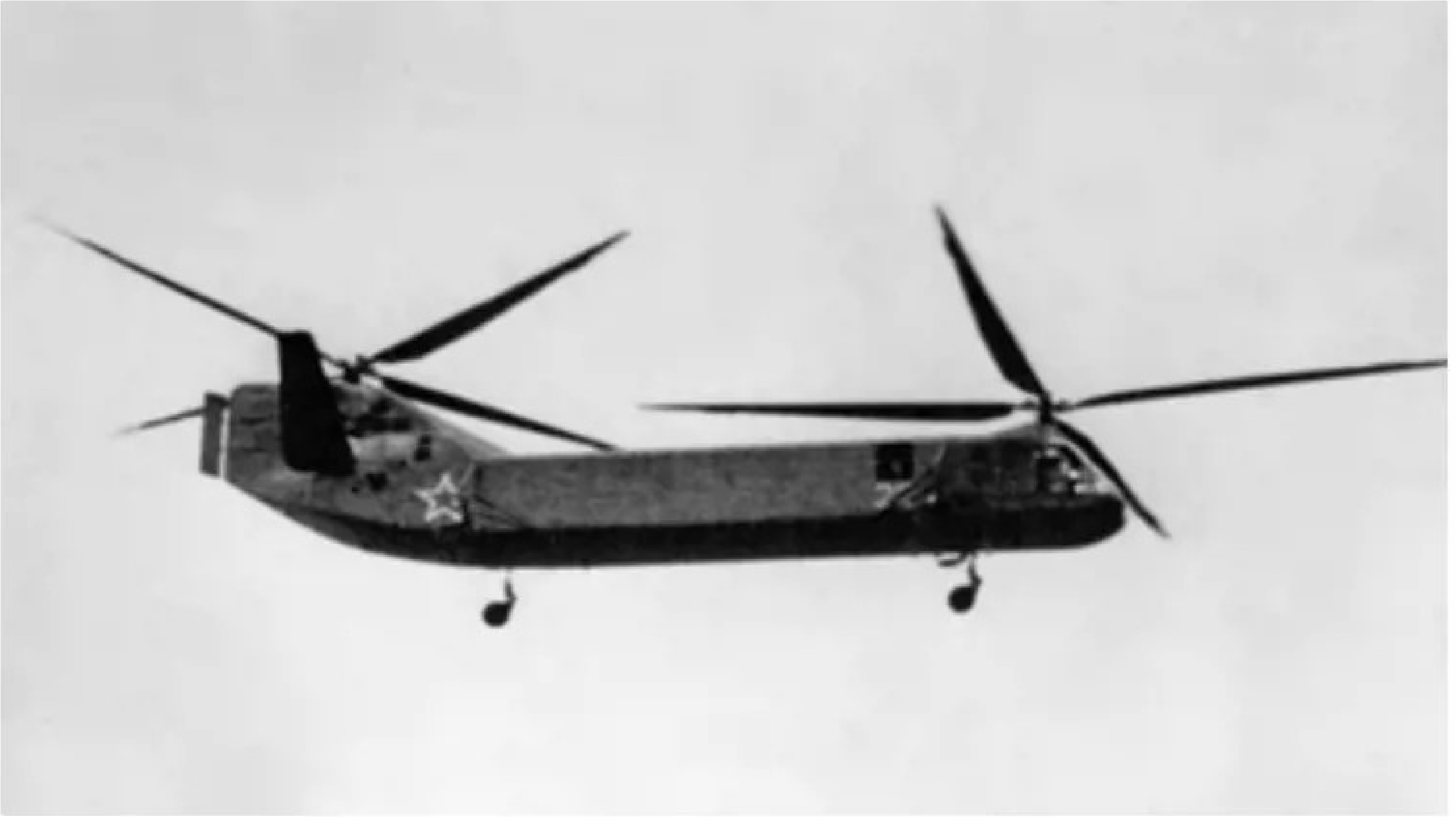
❖

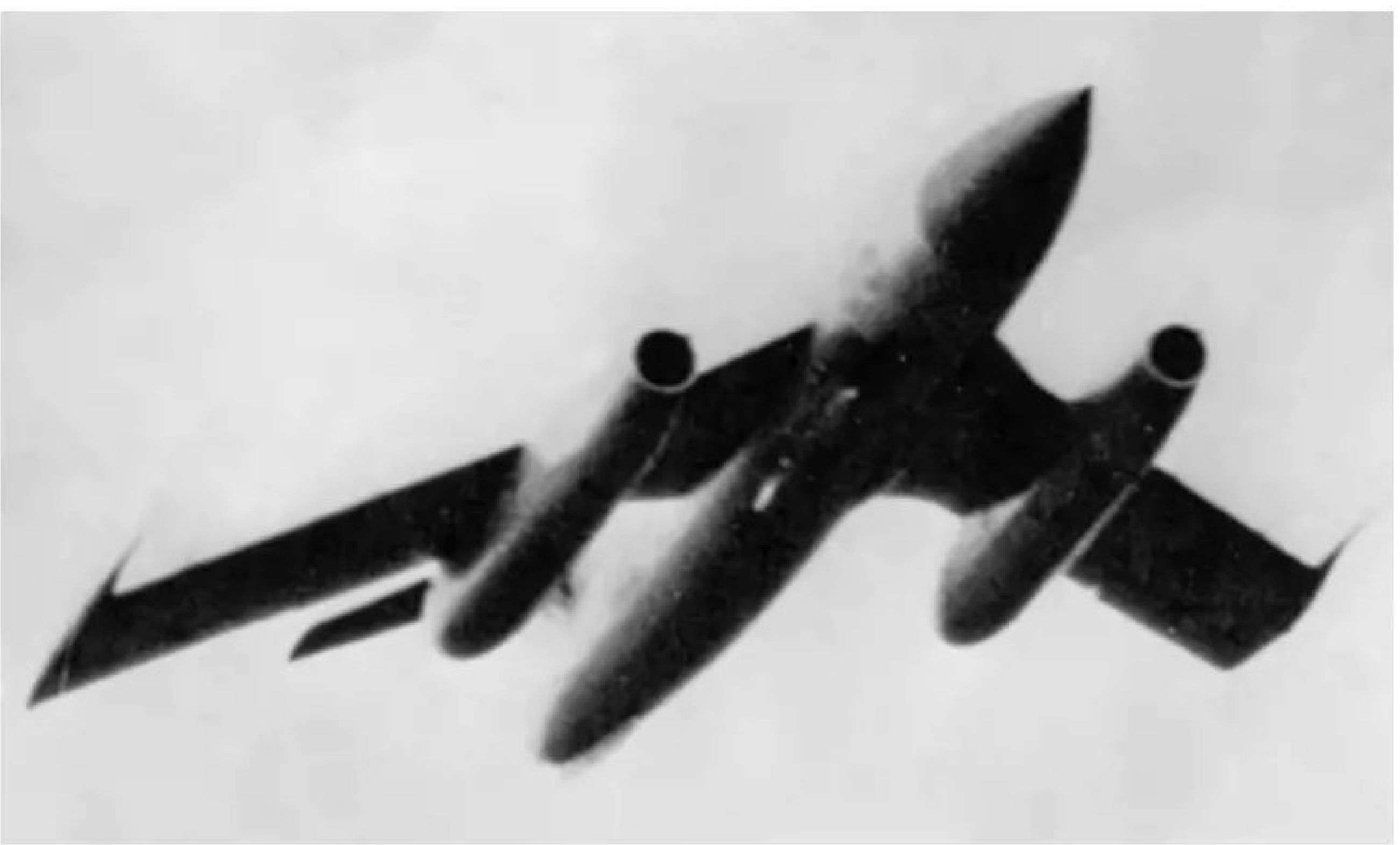
Since the visit was not "intended as an intelligence collecting expedition", as one confidential report put it, the detail which was gathered represented "a bonus". One of the interested British onlookers, Gp Capt Frederick Rosier, was group captain (plans) at Fighter Command. He wrote, "the fly-past of new and experimental types was executed at such speed" — his guess was Mach 0.9 — "and the aircraft were flying so closely behind each other that it was impossible to absorb many of the details". The RAF intelligence specialists concurred. Many, Rosier said, thought they saw one of the delta-wing fighters exhibiting tail flutter, though he didn't. Estimates of their performance suggested they were Mach 1.5-capable.

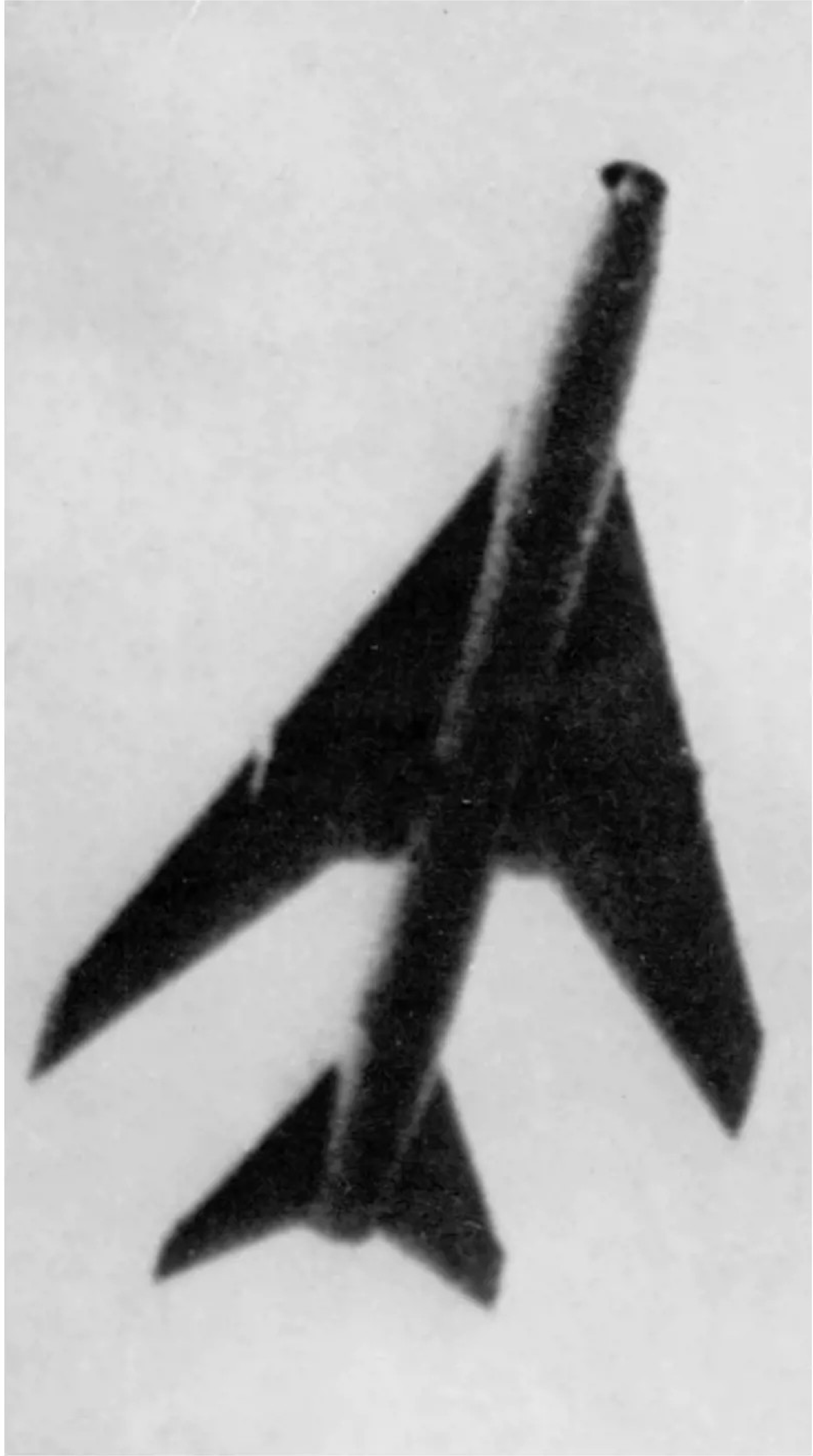
More was to follow the next day, when a static display was laid on at Kubinka. There was exhibited a type seen in the Tushino rehearsals, but not the Aviation Day show itself: a "twin jet light bomber", already given the NATO reporting name 'Blowlamp', with a bicycle main undercarriage and wingtip outriggers. The Ministry of Supply analysis said it was "the sensation of the whole visit", a "most advanced design" and "did not appear to be an early prototype because it had two guns, a full complement of aerials and seemed far more an early production model". In fact, this was the Ilyushin Il-54, and it was one of just two prototypes built before the programme was cancelled.

Of no greater significance were the other two debutants, the faintly absurd-looking Tupolev Tu-19 'Boot' single-turboprop naval attack aircraft, of which only two were made, and Ilyushin's Il-40P 'Brawny' twin-jet ground attack machine, which had already been canned. Since the visitors were only able to inspect these and









RIGHT: Scenes from the 1956 Tushino display. As shown clockwise from right, the M-4 was one of three that flew past, bombers being considerably outnumbered by fighters; Sukhoi's S-1 prototype, which had made its maiden flight the previous September, was misidentified by some western correspondents as being a Mikoyan product; the Yak-25 with "pointed radar nose"; and four Yak-24 twin-rotor helicopters featured in the airborne assault demonstration. ALAMY

the other aeroplanes "at a discreet distance from moving cars", "impressions were very difficult to make", but even the familiar ones hadn't been viewed that close-up before. Only a Tu-104 was made available for boarding, which hardly represented a revelation.

For many, the 26 June excursion to the air force technical academy at Monino was the most instructive item on the programme. There could be seen sectioned examples of types such as the Il-28, MiG-17, MiG-19 and Yak-25, the chance to view the airborne intercept radars carried by some of the fighters being welcomed, while quite extensive insights were provided into the different subjects covered — not just the likes of aerodynamics, structures and engines, but also chemistry and metallurgy. AVM Walter Cheshire, a Russian interpreter earlier in his RAF career who had become an air intelligence expert, served as air attaché to Moscow in 1942-43 and was now Air Officer Commanding No 13 Group, said the facilities far surpassed those in Britain.

Industry facilities were the focus for 27 June. The British connection was strong at Klimov's engine works, producing as it was the VK-1 series of engines on the basis of the Rolls-Royce Nene. Ilyushin's plant at Khodynka, otherwise known as Moscow Central Airport, was building twin-engined Il-14 transports. The Ministry of Supply team went to the same factories in reverse order, commenting of both that they "received the impression of a perfectly adequate organisation using rather more labour and rather less automatic machinery than in the UK", but that good-quality products were turned out nevertheless.

> ***"For half an hour the crew worked to trace the trouble without luck"***

One of those, an Il-14, conveyed the RAF officers from Khodynka to Stalingrad on the 28th. Stories of Soviet heroism during the wartime battle were high on the agenda, along with a lecture from the city's chief architect on its rebuilding. Memories of alliances not long past loomed large, Rosier writing, "We were followed by lots of people who were spontaneously cheerful and very friendly. Several mentioned the word 'peace' and tried to shake hands with us". There was no peace to be found on the leg back to Moscow, bad weather forcing the Il-14 to stay low to keep the ground in sight. Cheshire said it never went above 500ft. The performance cast some doubt on the ability of Soviet crews and aeroplanes to operate at higher level.

But at least it had flown at all that day, unlike the Comet. Back at Vnukovo, Soviet aviation experts

669
COMMAND
XK669
XK669

ABOVE: **Two days after it returned from Moscow, XK669 proceeded to the A&AEE at Boscombe Down for further trials with the Handling Squadron.**
KEY COLLECTION

had their opportunity to climb all over de Havilland's pioneering jet. Said Tupolev, "The Comet is a very beautiful machine. I like it". The DH publication *Enterprise* recounts what happened next: "Then thirty of them took their places in the aircraft for what was to be an hour's 'joy ride' to show the Comet's capabilities in the air. But, unfortunately, when Wing Commander Sellick tried to start the engines there was no response. For half an hour the crew worked frantically to trace the trouble but without any luck. Regretfully the Russians were asked to come back again in the afternoon. Mr Tupolev, before he went, had a sympathetic word with the crew: 'Don't worry. We've had the same sort of trouble with the 104', he said.

"An hour later the fault, an internal shorting of one of the aircraft's batteries, was discovered. A spare, carried uncharged in the aircraft's freight compartment, was quickly charged and fitted but eventually the flight had to be postponed because the Russian visitors couldn't get back before the weather had completely deteriorated."

XK670 was ready to take most of the RAF group back to London, some staying on a few days longer. Its departure on the morning of the 29th, and the four-hour 17-minute flight, passed off uneventfully. The Comet's maiden RAF mission was complete. But the technical snag had been an embarrassment, especially given efforts to rebuild confidence in the aeroplane. To quote a message from Ivelaw-Chapman, "a great deal of the value of our visit was lost through what was heralded in [the] British Press as the Comet fiasco…"

At least there was a chance to retrieve the situation. Now headed by Sir Thomas Pike, the remaining party members needed collecting on 3 July. This time Comet XK669 was sent to do the honours, and conduct the cancelled demonstration. "Cannot over stress importance of the success of this flight", Ivelaw-Chapman emphasised. He need not have fretted. Behaving perfectly, XK669 flew from Hatfield to Moscow, took the 30 Soviet experts for a 70-minute trip, picked up the rest of the British delegation and returned to Hatfield, all in one day. The *Red Star* newspaper remarked admiringly on its "perfect aerodynamic characteristics" and "beautiful streamlined shape". State test pilot A. K. Starikov, who had been among those involved in the Tu-104 sorties to London earlier in the year, was pleased to have a go at the controls.

Now, finally, the Secretary of State and the RAF hierarchy could breathe easy. Face had been saved, the Comet's honour restored — even if, for now, the Tu-104 was still the world's only commercial jet airliner in operation. That September, a Soviet delegation took up Britain's offer of a visit to the Farnborough show, where test pilot Gen Alexei Blagoveschensky was given a flight in a two-seat Hunter. The trip by Comet had achieved everything expected of it.

But for a parting thought, perhaps we should turn to AVM Kenneth Cross, AOC No 3 Group of Bomber Command — and not a man to mince his words. In summing up his views on the trip, he wrote to Ivelaw-Chapman how he was impressed by the Soviet Union's progress in becoming "at least" the world's second air power. But he added, "The visit confirmed my opinion that the Communist faith is a fraud. The state of the 'workers' (a word overworked by the Communist hierarchy) is pathetic. The contrast between our hotel and the shacks surrounding it, the queues outside the food shops, and the luxurious entertainment provided for us, was most marked.

"Maybe the hierarchy has a genuine fear of invasion and so spends much of its wealth on armaments. Having had a look at this vast continent, I am inclined to the view that the true aim is domination and exploitation of the rest of the world for the benefit of Russia…"

With thanks to Philip Birtles and Roger de Mercado.

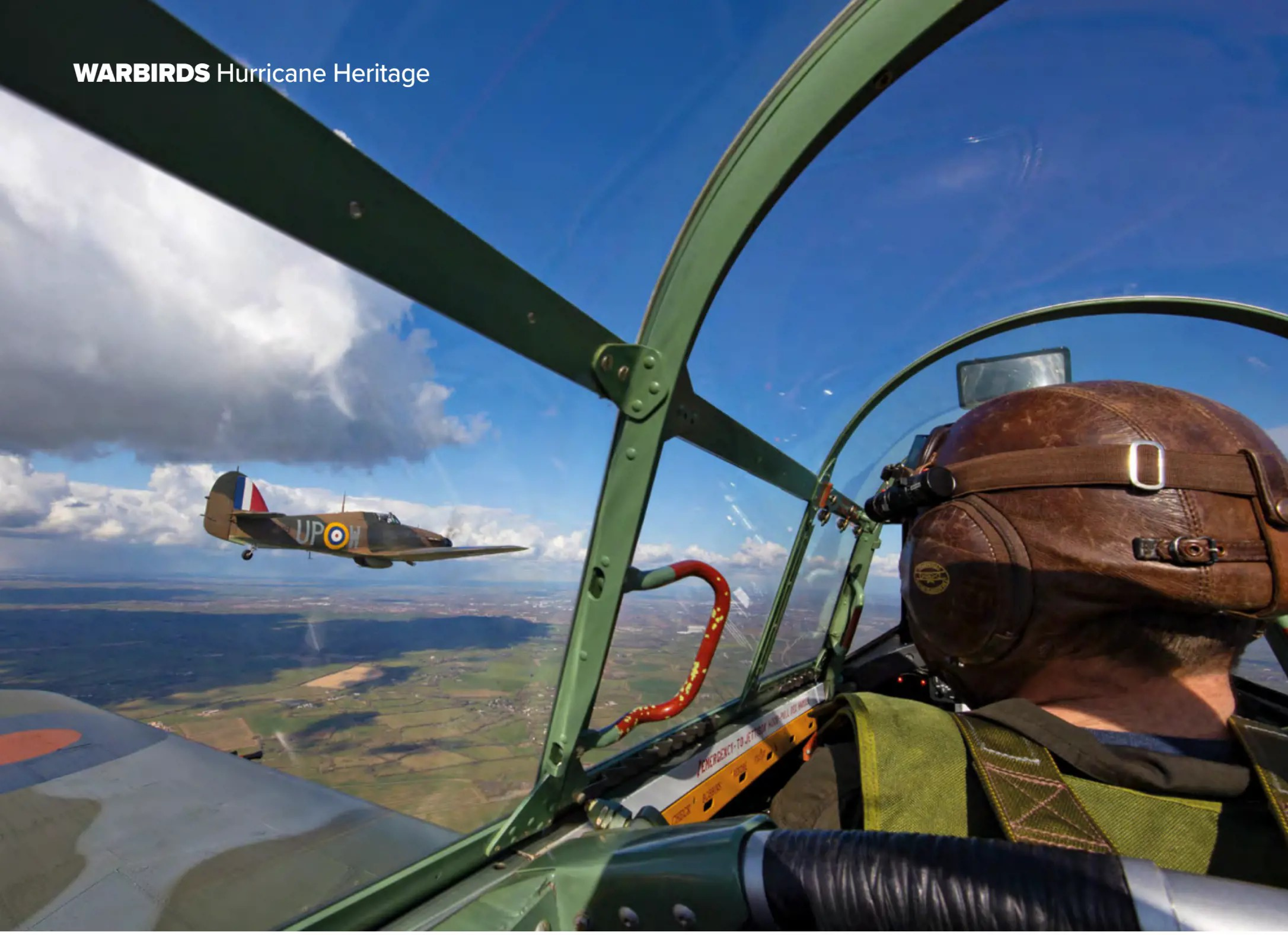
TWO'S COMPANY

BE505
LXP
MAURITIUS

Two-seat Hurricane XII 'BE505', with Mike Collett at the controls, leads MkI R4118, flown by its owner James Brown.

With the world's sole two-seat Hurricane operating alongside a famed Battle of Britain veteran, Hurricane Heritage has cemented its place in the UK's warbird scene. And it's done it in large part by pursuing its own path

WORDS: BEN DUNNELL PHOTOGRAPHY: DARREN HARBAR



ABOVE: The view out of the two-seater is superb — even when R4118 isn't in close company — and the spectacle inside of being able to view the pilot at close quarters also impresses.

On 19 July 1941 a Hawker Hurricane set off from White Waltham airfield, headquarters of the Air Transport Auxiliary. Its destination was Hatfield, where a number of the ATA's outstanding women pilots were waiting to sample the fighter, thereby proving their ability to fly such a powerful machine. It goes without saying that none of these splendid aviators had the slightest difficulty, and soon they were showing the same proficiency at jumping into a host of potent front-line aeroplanes, having only studied the pilot's notes, as they had on that momentous day. No need for a ride in a two-seater, had one even been available, which it wasn't.

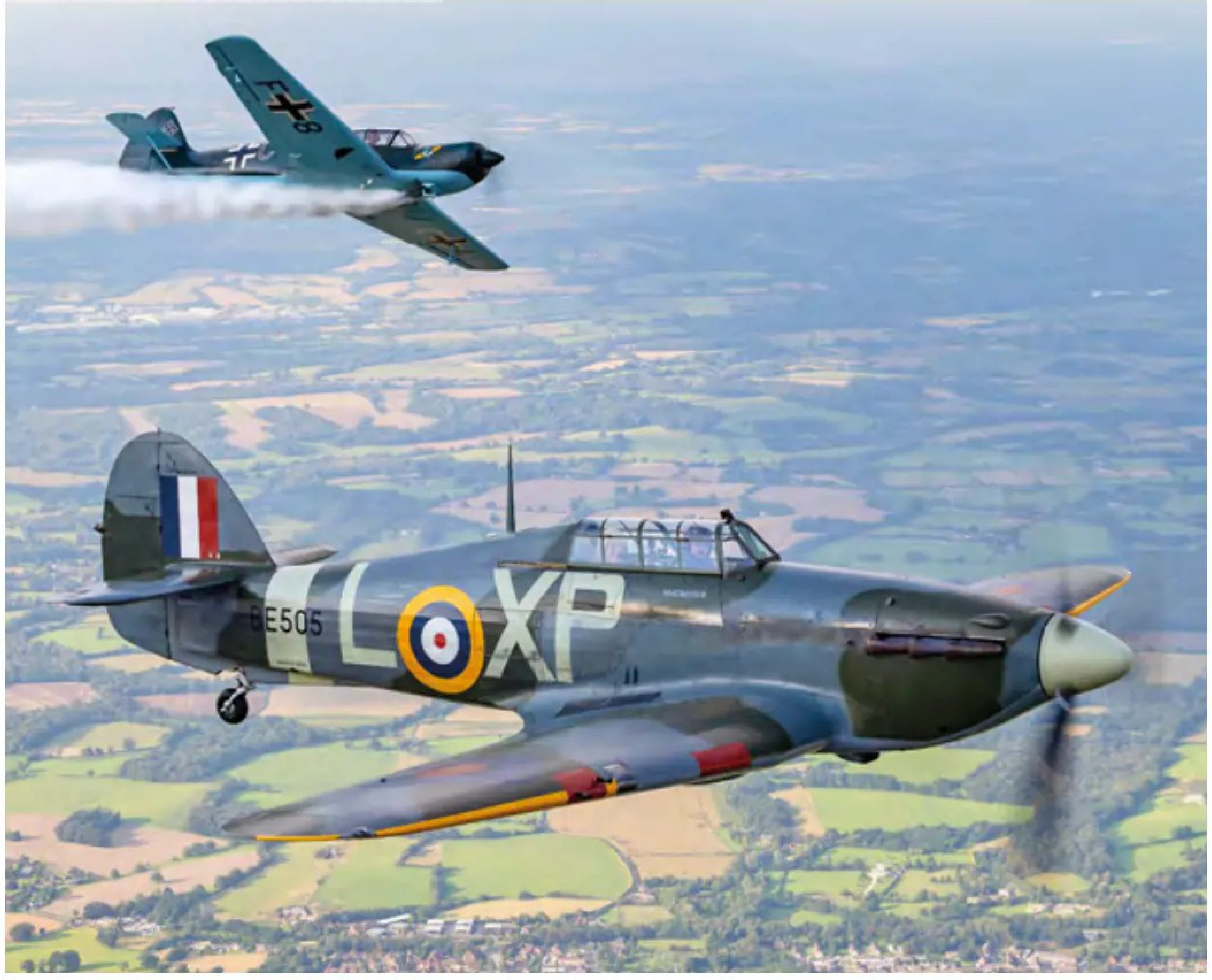
Today, it is. What's more, said Hurricane has now become a familiar sight flying from the historic aerodrome near Maidenhead in Berkshire, where it evokes to paying passengers something of the experience many an ATA member had more than 80 years ago. White Waltham has changed a great deal since then, yet it remains an all-grass airfield, surroundings to which the type is very well-suited. That was true in 1940-41, when Hurricanes were used here by the ATA training establishment. It's still the case now as the converted Canadian-built MkXII named *Pegs* plies its trade.

This it does under the Hurricane Heritage banner, as established by James Brown when, in 2015, he acquired Battle of Britain combat veteran Hurricane I R4118. The software entrepreneur's progression from being a private pilot to not only owning this outstanding specimen but flying it himself has been a long one. The next stage was gaining his display authorisation, which, since the summer of 2021, has seen him performing at many major airshows. "The whole journey has been about incremental steps", says Brown. "Looking back on that, all the steps have felt perfectly manageable. Once you get to where you are 10 years later, you're surprised at the progress that's been made."

> ***"From looking at the aeroplane to buying it was two months"***

The connection that brought about this expansion was made during James's training on the Harvard IIb, FE511, he bought to help him step up to the Hurricane. This he did out of White Waltham, where experienced aerobatic instructor Mike Collett started running his own aerobatic school in 2018. "It got to the point in James's training", says Collett, where he needed to transition on to learning to fly aerobatics, to further his flying… We went down that journey, and I got James's aerobatic rating via a combination of the Harvard and the Extra 330LX that we've got. He then, very kindly, let me continue to fly his Harvard."

While all this was going on, Hawker Restorations had purchased the Hurricane XII, G-HHII, from previous owner Peter Teichman for modification into



LEFT: An unusual experience offered with the two-seater sees 'Bf 108' (Nord 1002) G-ETME joining for a spot of mock combat.

a two-seater. The Suffolk-based firm had originally restored it for Teichman as a 'Hurribomber', BE505 *Pegs*, of No 174 Squadron, and it took to the air again during early 2020 in the same colours but with the tasteful addition of a rear seat. Such was the growth in UK warbird passenger rides under the Civil Aviation Authority's Safety Standards Acknowledgment and Consent (SSAC) regulations that the availability of a suitably altered Hurricane presented a commercial opportunity. Come that September, *Pegs* was being leased out by Hawker Restorations to the Biggin Hill Heritage Hangar and carrying its first customers.

From there, Mike Collett takes up the story. "A friend I knew through gliding approached me just post-lockdown. He said he was working with an investor who was well-known in the vintage car world, keen to explore the possibilities of owning a warbird. Did I think we could tie something up? There were rumours starting to come out that the two-seat Hurricane was up for sale and there was an opportunity there. It would obviously be quite individual… From first going to look at the aeroplane, and the concept stage, to buying it was probably only two months.

"Hurricane Heritage started with James, with R4118 and the Harvard, and it was his baby. I was flying R4118 before *Pegs* came along. Once this opportunity came up, we wondered whether we could use the Hurricane Heritage 'brand' James had created and operate the aeroplanes under that. I first flew *Pegs* in March 2022, which was our first season of SSAC in it."

How was that approval gained? "In the early days", says Collett, "I had done the legwork to try and do that ourselves. However, in a chance conversation with James Gilmour, the maintenance manager at the Aircraft Restoration Company, he suggested I speak to John Romain and see if we could come to an arrangement. Very quickly we reached an agreement that we could share the aeroplane between Aerial Collective at Duxford and here.

❖

"Bear in mind, the maintenance was already being done at ARCo, and it was always going to go there because they know Hurricanes like the back of their hand. They were instrumental in everything we were doing at the time from an engineering point of view, so it seemed logical. They were obviously very keen to have more diversity in their SSAC 'toolbox' […] and it seemed to fit really nicely within their model. And they brought a huge amount of experience to the party. So, when that was offered, it took a lot of the weight off our shoulders."

While *Pegs* spends some of its time operating as part of the rides programme with Aerial Collective at Duxford, White Waltham is the focus for Hurricane Heritage, flights of 30, 40 and 65-minute duration being offered. The latter encompasses the south coast and the Isle of Wight; the shorter sorties take in the Thames and surrounding areas. All sorts of interesting World War Two history can be covered, including Medmenham, the former home of RAF intelligence, as well as Benson and Bicester. There are also formation trips with R4118 or the Harvard, and mock combats with a classic airshow 'baddie' in the form of a Messerschmitt Bf 108, in reality a French-built Nord 1002.

Pegs is probably the UK's most active civilian Hurricane, so what of serviceability given the level of utilisation? Collett describes it as excellent. "Being fabric-covered, it's a fine balance between doing loads and loads of flying on it

LEFT: James Brown (left) and Mike Collett regularly fly the Hurricanes together, Mike having been instrumental in James's training.

ABOVE: Harvard FE511/ G-CIUW is operated by both Hurricane Heritage and Ultimate Aerobatics for air experience flights and training.

and getting to a point where the aeroplane is deteriorating, and not doing enough. I think we're about there. We've got another engine being built by Vintage V-12s at the moment; that's been a burden financially for the past few years, because we've had to keep money going into that, but it should be nearly done."

This is, of course, the only two-seat Hurricane in the world, and its configuration is quite different when compared with a lot of other warbirds that have been likewise modified. Collett says, "The view from the back seat is very good. You can look round the pilot and see the intricacies of the gear selection and the flap selection, because you can see where their hand is to operate them..." Operations manager Abigail Clark adds, "To look out over a Hurricane wing at the English countryside is just extraordinary. It's lovely to be in the same cockpit as well. You feel very much part of the pilot experience because you're tucked in behind them."

Being at White Waltham means, as Collett points out, "the Hurricane is the star of the show". There's a suitably intimate feel to the premises of the West London Aero Club, where Hurricane Heritage has its facility, and the atmosphere comes alive in summer when this always busy general aviation airfield sees its peak activity. Lots of people therefore get to see the aeroplanes up close. Situated close to Heathrow and within easy distance of London, no wonder so many overseas visitors — from as far afield as Australia, New Zealand, Saudi Arabia and Hong Kong — make the trip. Some regulars come back multiple times, sampling everything in the fleet. Would expansion to other venues be considered? There have been many requests, and while the idea hasn't been rejected out of hand, there are no current plans.

> ***"In the Hurricane you feel part of the pilot experience"***

Demand for warbird rides in Britain has barely slowed since they became possible just over a decade ago, and Brown speaks for many when he says, "I think that's been transformational for the whole industry. People are now experiencing these aircraft first-hand, where in the past you'd be lucky to get within 50ft of one. It totally changes people's relationship with them". Collett outlines another big benefit: "SSAC has created an entire industry that supports the rest of the warbird scene. The flying is so much safer because the pilots are more current than they've ever been, and the engineering has been built up". That, in turn, has all been a boost in terms of display activity.

For Brown, becoming a display pilot has proved to be everything he'd hoped for, and more. "It's been really fascinating. My initial goal was simply to fly the aeroplane, and I wasn't even sure I could do that. Then we got to the point where the Harvard was very useful in allowing me to step up to the Hurricane, and also enabling me to get my initial display authorisation". 'Dodge' Bailey was his first display authorisation evaluator, and guided him through the upgrade that enabled a debut Hurricane performance at Little Gransden in August 2021. From there it was a case of adding layers, in the form of approval to participate in tailchases and formations of larger sizes, and lowering his base height.

"Formations have really changed the game completely for me", says Brown. "As we all know from watching displays, a single fighter, particularly at a big venue, sometimes gets a little bit lost. So to have multiple aircraft in a display — and the first one I did was with Clive Denney in a Spitfire V at a Duxford show — adds something. The really exciting things that's enabled for me are the 'Big Wings' at Duxford. I've done that for the past two years, and those are things I never could have dreamt I'd do. Because the Hurricanes are at the back of that formation, the view you get is extraordinary."

When Collett started displaying the Harvard, he already had experience as a member of the Great War Display Team and in aerobatic aircraft. But once he got into the Hurricane, to start flying a warbird fighter and take part in big scenarios and formations was the fulfilment of a dream: "I'd never, ever wanted to do anything else, so it was a massive moment". He flew R4118 at Headcorn in 2022 and graduated to Duxford's 'Big Wing', a 20-ship, that September.

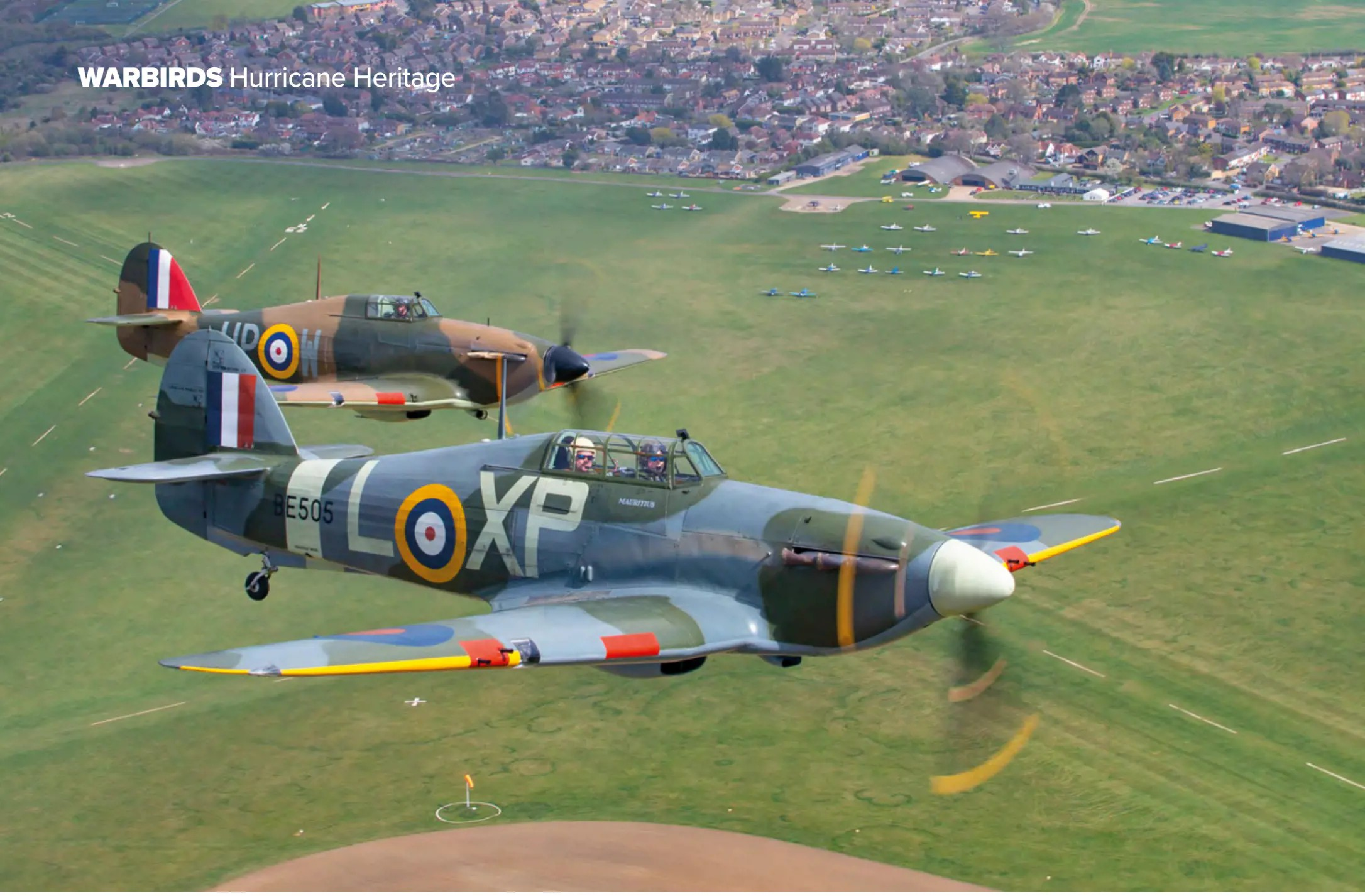
In display flying terms, both men have entered the fray during an era where the surrounding regulatory and supervisory framework has been substantially tightened. The lessons they've learned are good ones for anybody thinking of following in similar footsteps. What are Collett's key learning points? "Be on 'receive'. Have good mentors, and listen to people who do it on a regular basis, like Stu Goldspink and Jon Gowdy. Don't be afraid to ask people questions, and lean on your support network."

❖

And what about Brown? "The mental preparation of walking through your display, taking time away to get centred on what you're going to do. Thinking about heights, speeds, what the wind's doing — all of those factors are things you can contemplate before the event, but on the day you have to take into account site specifics that are going on. That goes for solo as well as formation. With formations there's an added level of complexity and responsibility: responsibility to your wingmen that you are clearly briefed. You brief really well as a team for precisely what's going to happen in a happy case, where it all goes to plan, and you've also got a really clear idea what happens in the unhappy case where you have to break away or somebody else does, and you have to do that without introducing any additional risk to anybody else."

The Duxford Battle of Britain show in 2023 was an interesting one. Gabriel Barton was meant to lead a Hurricane four-ship in Fighter Aviation Engineering's MkI, but it was unserviceable and dropped out shortly beforehand, leaving Collett — who would otherwise have been in box — to take the lead. "Suddenly", he recalls, "I

The SSAC rides in *Pegs* have proved very successful for Hurricane Heritage, while the aircraft is also operated by Aerial Collective at Duxford.



ABOVE: **Both Hurricanes over White Waltham, where the West London Aero Club provides a delightful base, and its clubhouse a social focal point.**

found myself in a position, with not very much notice, where I had to put a three-ship together". With him were Brown and Matt Pettit, both fairly recent additions to the list of Hurricane display pilots, but they did an excellent job.

"It can be challenging, but you can go and talk to people who do it all the time. Luckily I know Matt and James very well, and I've flown with James a lot, so it's knowing the capabilities of your wingmen and not overstretching them. You've got to put the prep in beforehand so everyone knows exactly what's going to go on. And I've learned from the people I've followed that it's really important to 'patter', in a very calm way, what's coming next, keeping everybody in the loop."

That translates into the larger formations like Duxford's annual 'Big Wing', in which the Hurricanes are positioned at the back. "If I'm in *Pegs*, I've got a lot more power in that aeroplane [than the Merlin III-engined MkIs], but as much as I want to get in without overworking the engine, you've got to be considerate to your wingmen."

Situational awareness when bringing the Hurricane element in at the rear is all-important. "You might think it's not very difficult to know where to put the formation, but when you've got a sea of Spitfires they all look very similar. I always write on a kneeboard that, say, I should have the MkXI in front of me and a MkV to my right, so I can visualise what I'm looking for. Make sure you know what to expect."

Demonstrating these aeroplanes at displays represents, in many ways, a pinnacle of satisfaction and enjoyment. But in this instance the SSAC trips offer their own, very special, highlights. Some customers bring in relatives' logbooks and medals. One was Angus Barclay, whose father, Richard Barclay, was awarded the DFC for his actions in the Battle of Britain while flying Hurricanes with No 249 Squadron. Courtney Dohnt visited from Australia; she's the granddaughter of Charles Bryce Watson, who flew the real BE505 with No 174 Squadron and was shot down in the aircraft during the August 1942 Dieppe landings, being taken prisoner. She went for a flight in the aeroplane painted as her grandfather's mount and brought photos of him in the original *Pegs*. Present at the same time was Eugenie Brooks, whose father John had been on 174 with Bryce Watson, and had memorabilia of her own to show. Eugenie had never met Courtney before.

> ***"We looked at each other, and it was an emotional moment"***

In 2023 an honoured guest and passenger was Jeff Brereton, then 102, who worked as a flight mechanic on R4118 at Croydon during his service with No 605 Squadron. Collett recalls, "On that day we flew both Hurricanes, James on my wing. You could just see in his face the joy. He's flying in a Hurricane, looking at a Hurricane he worked on during the war". Brown loved it, too. "To have him flying in *Pegs*, and me alongside, was just mind-blowing. I know Mike and I both looked at each other at one point as we were alongside, and it was an emotional moment, put it that way."

That, more than anything else, is the sort of memory warbird passenger flying can engender. And it could only have happened, of all the warbirds in the world, with these two Hurricanes.

For more information and to book a flight, visit www.hurricaneheritage.com

FLY THE WORLD'S ONLY TWO-SEAT HURRICANE

"A once-in-a-lifetime experience that went beyond my wildest expectations"

"What a privilege to fly in such an iconic aircraft"

Join the lucky few who have enjoyed a truly awe-inspiring flight in the world's only two-seat Hawker Hurricane.

Your experience will start with a personal pre-flight briefing, before you climb aboard to take to the skies. Having strapped in for the flight-of-a-lifetime, you will relish the sensational roar of the Merlin engine as your Hurricane climbs out over the beautiful Berkshire countryside surrounding our home base of White Waltham.

Choose from a range of flight times and enjoy the exceptional handling of this legendary fighter at first hand, making memories you will treasure. Afterwards there will be ample time to tour the aircraft and take photographs, before you and your guests enjoy the restaurant and fully-licensed bar in White Waltham's period clubhouse.

HURRICANE
HERITAGE

ATA
AETHERIS AVIDI
WLAC
WHITE WALTHAM

UNIQUE HURRICANE FLIGHTS
£2,875
30 MINUTE EXPERIENCE

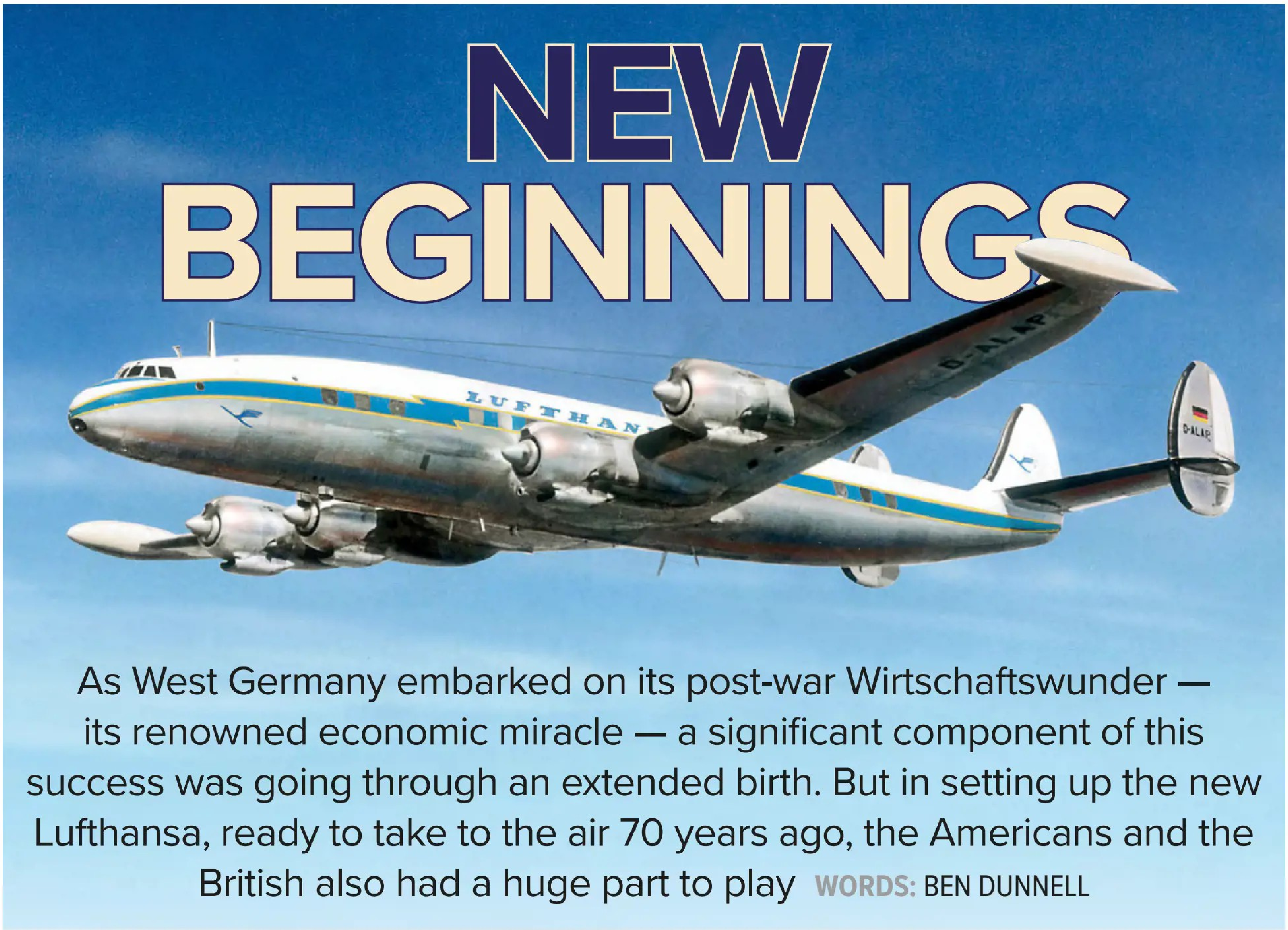
For more information, contact:

hello@hurricaneheritage.com | www.hurricaneheritage.com | 01628 290282

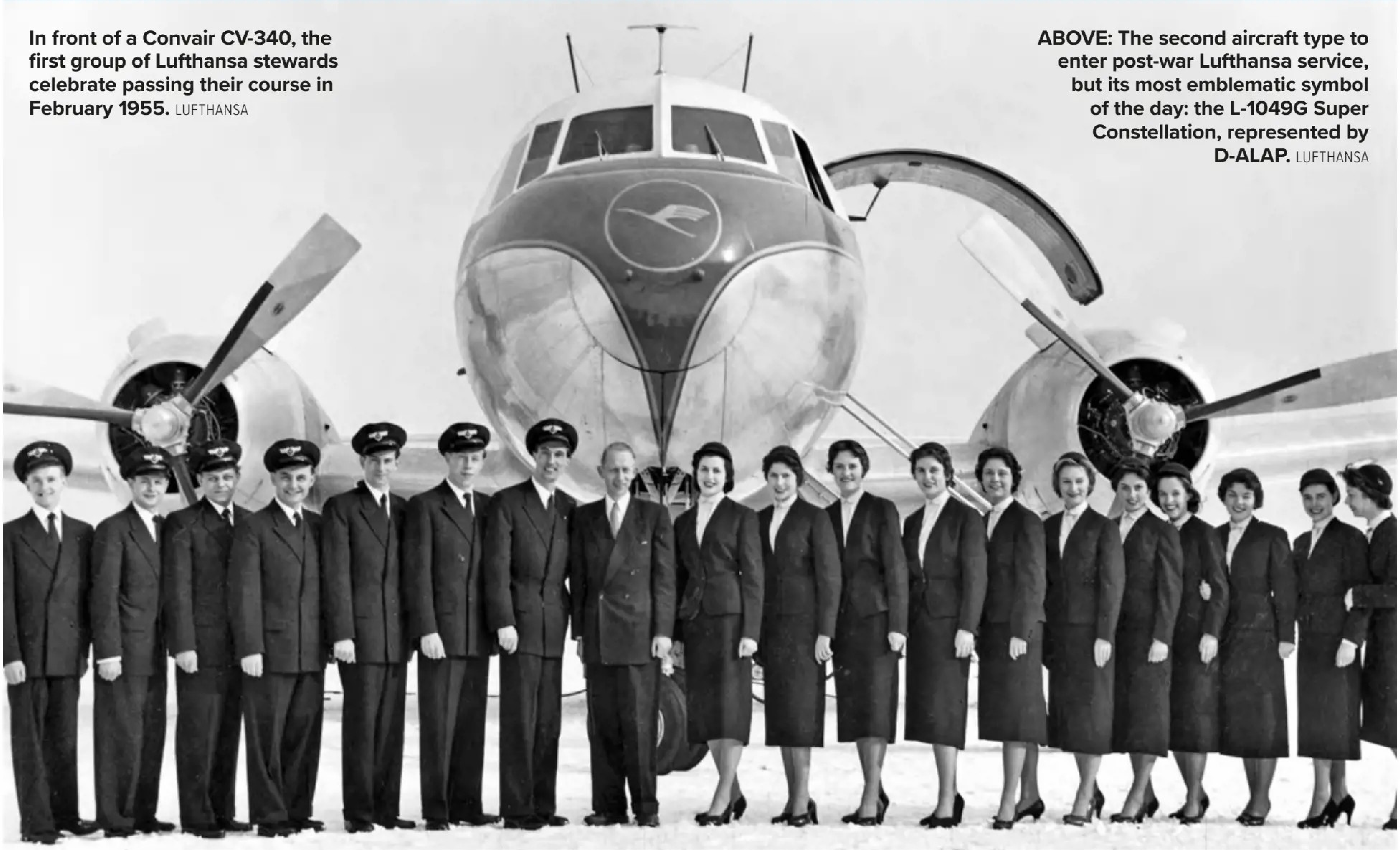
NEW BEGINNINGS

As West Germany embarked on its post-war Wirtschaftswunder — its renowned economic miracle — a significant component of this success was going through an extended birth. But in setting up the new Lufthansa, ready to take to the air 70 years ago, the Americans and the British also had a huge part to play

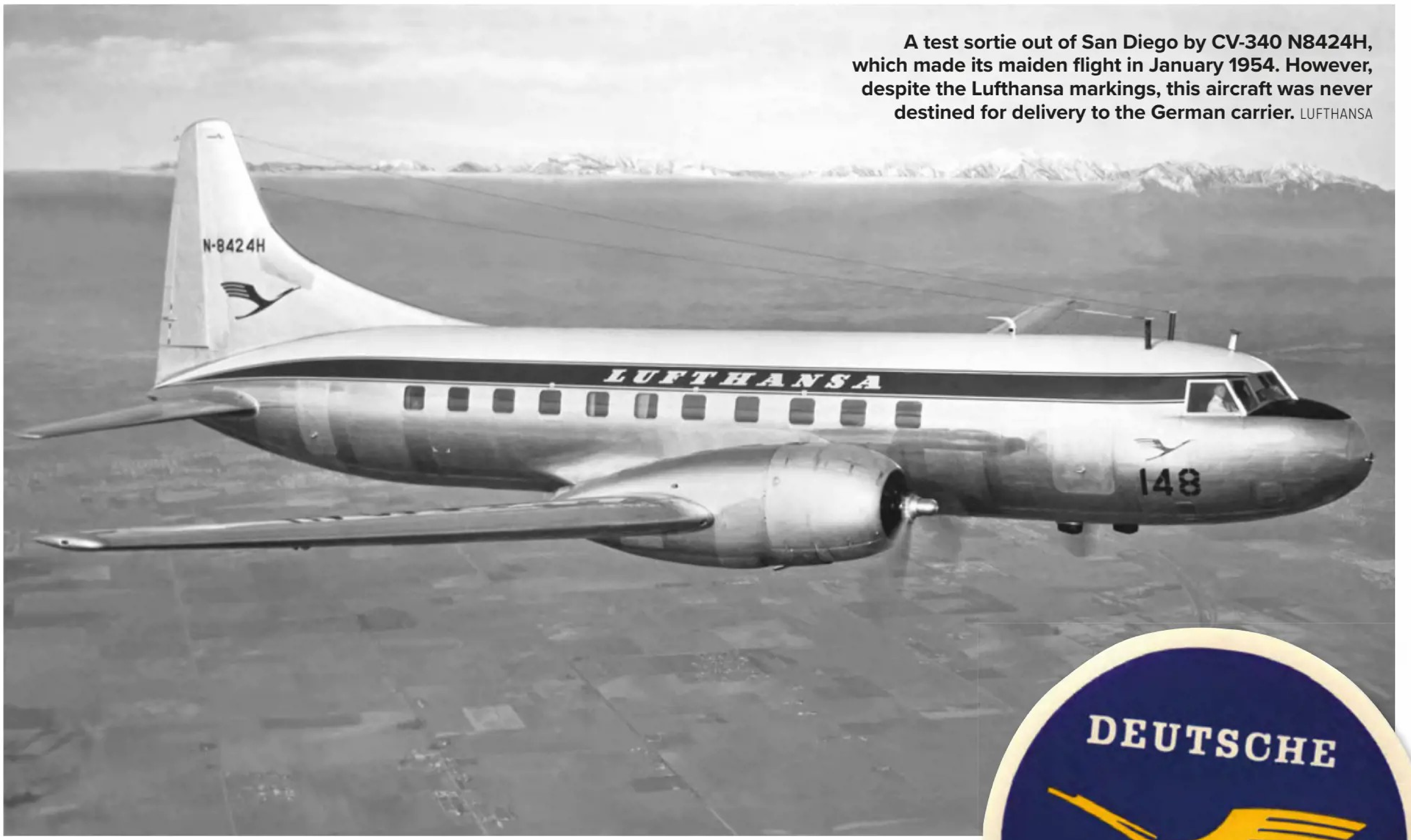
WORDS: BEN DUNNELL



ABOVE: The second aircraft type to enter post-war Lufthansa service, but its most emblematic symbol of the day: the L-1049G Super Constellation, represented by D-ALAP. LUFTHANSA



In front of a Convair CV-340, the first group of Lufthansa stewards celebrate passing their course in February 1955. LUFTHANSA



A test sortie out of San Diego by CV-340 N8424H, which made its maiden flight in January 1954. However, despite the Lufthansa markings, this aircraft was never destined for delivery to the German carrier. LUFTHANSA

DEUTSCHE
LUFTHANSA

Munich-Riem airport, 07.42hrs, 1 April 1955 — another significant step in Germany's move into a prosperous post-war future. At that moment Lufthansa, the country's historic national airline, restarted scheduled services in its new guise when a Convair CV-340 took off bound for Hamburg. From the initial fleet of eight piston-engined aeroplanes, Lufthansa grew to become one of the world's largest carriers.

There were many significant 'new beginnings' in West Germany around that time, 10 years after the end of World War Two. The country was still occupied by the Allies, but a democratic German government led by Chancellor Konrad Adenauer had been in place since 1949 and reconstruction was proceeding apace. This involved not just the physical reconstruction of the nation's infrastructure, but also the rebuilding of national institutions in new guises for peacetime. Among these was, naturally, a flag-carrying airline able to renew links between cities in the Federal Republic and elsewhere across the world, useful for business and economic purposes as well as leisure travel. The re-establishment of such a company was absolutely in the national interest.

Then styled as Deutsche Luft Hansa, the 'old' Lufthansa had been established on 6 January 1926 and began services that April. It continued operations right up until the end of World War Two, after which the occupying Allied powers declared in part of the Potsdam Treaty that Germans were to be prohibited from manufacturing, owning or operating aircraft for the time being. In addition, the military authorities either confiscated or took control of all the company's assets. The once great German airline was dead, and early attempts to revive it came to nothing.

In any case, Germans were not even allowed to travel by air in the immediate aftermath of hostilities, a situation that prevailed until 1948. The market was the preserve

LEFT: Hans Bongers had worked for the 'old' Lufthansa and was instrumental in setting up the new one. LUFTHANSA

ABOVE: One of the first two CV-340s for Lufthansa is marshalled in at Hamburg-Fuhlsbüttel on delivery in November 1954. LUFTHANSA

ABOVE RIGHT: The Convairs soon began transporting mail on domestic services for the Bundespost. LUFTHANSA

of American, British and French airlines, but it did not take long for more serious efforts aimed at setting up a flag-carrier to begin. One notable intervention was by former shareholders in Aero Lloyd, which had been merged into the original Deutsche Luft Hansa during 1926, but it fell through. Far more successful were two men, the Federal Transport Minister Hans-Christoph Seebohm and his expert special advisor on air transport issues, Hans Bongers, who had been the old carrier's operations manager and sought as early as 1945 to persuade the American military occupation authorities that some of its assets should be retained. The response then was wholly negative, and the Allies banned him from any involvement in aviation, yet Bongers was undeterred. To be near the then provisional capital city of Bonn, he set up an office in Cologne; this is why Lufthansa's headquarters was later established there.

It took some time to make the initial arrangements, but an airline company then known as the Aktiengesellschaft für Luftverkehrsbedarf (Corporation for Air Transport Requirements), or Luftag for short, was formally established on 6 January 1953. Start-up capital worth six million Deutschmarks was largely provided by the federal government, the state of North Rhine-Westphalia and the national railway operator, the Bundesbahn. At that time, it had no aeroplanes, and in providing those American makers enjoyed a significant advantage. The dollar loans necessary to purchase an aircraft fleet would be furnished, as the *Westdeutsche Neue Presse* newspaper pointed out, "by quarters close to the American companies". In no way could heavily indebted Britain hope to compete in that respect, even though there were certain advantages to making an acquisition in sterling.

> ***"The Allies banned Bongers, but he was undeterred"***

Orders covering four each of Lockheed L-1049G Super Constellations and Convair CV-340s were duly placed later that year, totalling 68 million Deutschmarks. Competition for these and future deals was hard-fought. The Super Constellations were procured instead of the cheaper Douglas DC-6Bs originally favoured — and which shared the same Pratt & Whitney R-2800 engines as the Convairs — but for which suitable financing could not be arranged with the manufacturer. By contrast, Lockheed offered its aircraft with, according to its chief designer Hall Hibbard, "a long-term credit which had probably never been equalled". In a similar fashion, Convair was able to put forward the CV-340s with a very short delivery timescale and "considerable financial facilities". The battle for national influence over the new West German airline would likewise be a keen one.

Britain still wanted its slice of the cake. Before Luftag technical director Gerhard Holtje visited London to give a lecture in May 1953, a Ministry of Civil Aviation official commented, "it is in our interests to give them all the material and knowledge possible, because I have not yet lost hope that they will ultimately come to buy our aircraft". Previous signs had not been positive. A German demonstration of the Vickers Viscount had proved unproductive, Bongers appearing, in the words of the British commercial representative to West Germany, "to have preferred to try to ignore" its existence, while others in the Luftag set-up expressed concerns about the turboprop's teething troubles and its operating economics over the short West German domestic sectors. With hindsight, not buying the DH Comet — with which, in Comet 3 form, Bongers and others were far more taken — would prove to be a blessing.

The director of UK civil aviation in Germany, former Bomber Command Lancaster pilot Gp

Capt Peter Johnson, called Bongers, “undoubtedly the key man, and equally undoubtedly pro-American”. He was, said Johnson, unconvinced by the technical arguments put forward in favour of British types, meaning only “Better and definite credit terms” or potential joint ventures with the West German aviation industry could swing the balance in the UK’s favour. But it could be involved in other ways.

That September, British assistance was requested in preparing a preliminary ground training course for Lufthansa’s first groups of potential captains and flight engineers, four of each, to be carried out by German instructors using UK material. Philip de Zulueta of the Foreign Office remarked that not doing so — and in

“HITLER’S AIRMEN FLY IN BRITAIN”

Headlines like that, from the far-flung *Sun News-Pictorial* in Melbourne, were inevitable but hardly welcome. It was to be expected that Air Service Training’s instruction of future Lufthansa pilots at its Hamble facility would generate some degree of less-than-positive publicity, coming so soon after those same individuals had been at war with Britain. Even so, the case of one of them came as an unpleasant surprise.

On 6 March 1954, reports emerged in the UK press stating that Johannes Rathje had been imprisoned after the war for espionage. Specifically, he was sentenced by an American military commission in Shanghai for, said a memo from the British high commission in Bonn, “having violated the German surrender by continuing military activity in China; this consisted in intelligence work, mainly radio interception, on behalf of the Japanese”. A report by the US Strategic Services Group, a forerunner of the CIA, said he reported back to Berlin with details of Allied aviation activities in the Far East theatre. Found guilty, he was brought back to Germany and jailed at Landsberg, before being released in 1950 prior to expiry of his sentence.

Having started flying for the German flag-carrier in 1926, Rathje had a long connection with the Far East. From 1931-34 and 1937-41 he piloted Junkers W 33s and Ju 52/3ms for the Eurasia Aviation Corporation, a Lufthansa joint venture with the Chinese. When Eurasia had to shut down its operations in 1941, he had no way of returning to Germany, so he stayed on in Shanghai, being — his subsequent account stated — called up during 1944 as a Luftwaffe reservist and assigned to the German embassy in Shanghai as a liaison officer to the Imperial Japanese Army Air Force. By the time he arrived in Britain at the beginning of January 1954, he had 15,000 flying hours to his name. Asked by the *Evening Standard* whether he’d flown since 1945, he replied, “Well, not officially”. All four of the pilots said they had never flown over Britain during wartime.

Discovery of Rathje’s recent past was an embarrassment. This was especially as the British Intelligence Organisation (Germany) had told the German authorities about his time in prison when presented with a list of 48 potential Lufthansa pilots back in December 1952. That report clearly was not passed on to the German transport ministry when it selected the trainees. Knowing their presence in Britain was sanctioned by the government, the consulate-general in Düsseldorf assumed the men had all been subject to the requisite security clearance and granted them visas.

For his part, Rathje was keen to clear his name. Writing to Air Service Training on 11 March 1954, he outlined his career, denying he had ever been personal pilot to Hermann Göring — an accusation made in most reports of his 1946 arrest in Shanghai — or, indeed, a spy. He said, “about 20 other members of the German Embassy” had been sentenced at the same time, and that when the case “was later reviewed by a Military Government Court […] we were released from confinement by order of the reviewing authorities”. Rathje added, “I have never been a member of the Nazi Party.”

By then, of course, it was too late. Everyone was keen to avoid any repetition, and indeed there wasn’t one. The Rathje affair was among the teething troubles the new German airline, and those assisting in its formation, simply had to put behind it.

For the benefit of a visiting press photographer, ex-RAF Wellington navigator A. J. Plowman (centre), now employed by Air Service Training at Hamble as an instructor, shows the first four Lufthansa pilot trainees a compass deviascope during their period of instruction in Britain. From left to right are Walter Blume, Herbert Topp, Johannes Rathje and Rudolf Mayr. ALAMY turn leaving the way clear for the Americans to help — "may in turn adversely affect the attitude of the future German pilots towards British aircraft."

There was another aspect. It was, stressed a representative of the British embassy in Bonn, "important to retain a measure of goodwill and cooperation between the Germans and ourselves in civil aviation since when the Occupation Statute ends BEA and BOAC will be subject to normal competition in Germany and if the local atmosphere is hostile all sorts of difficulties might be put in their way". On both sides of the Atlantic, commercial considerations as well as political ones were coming into play.

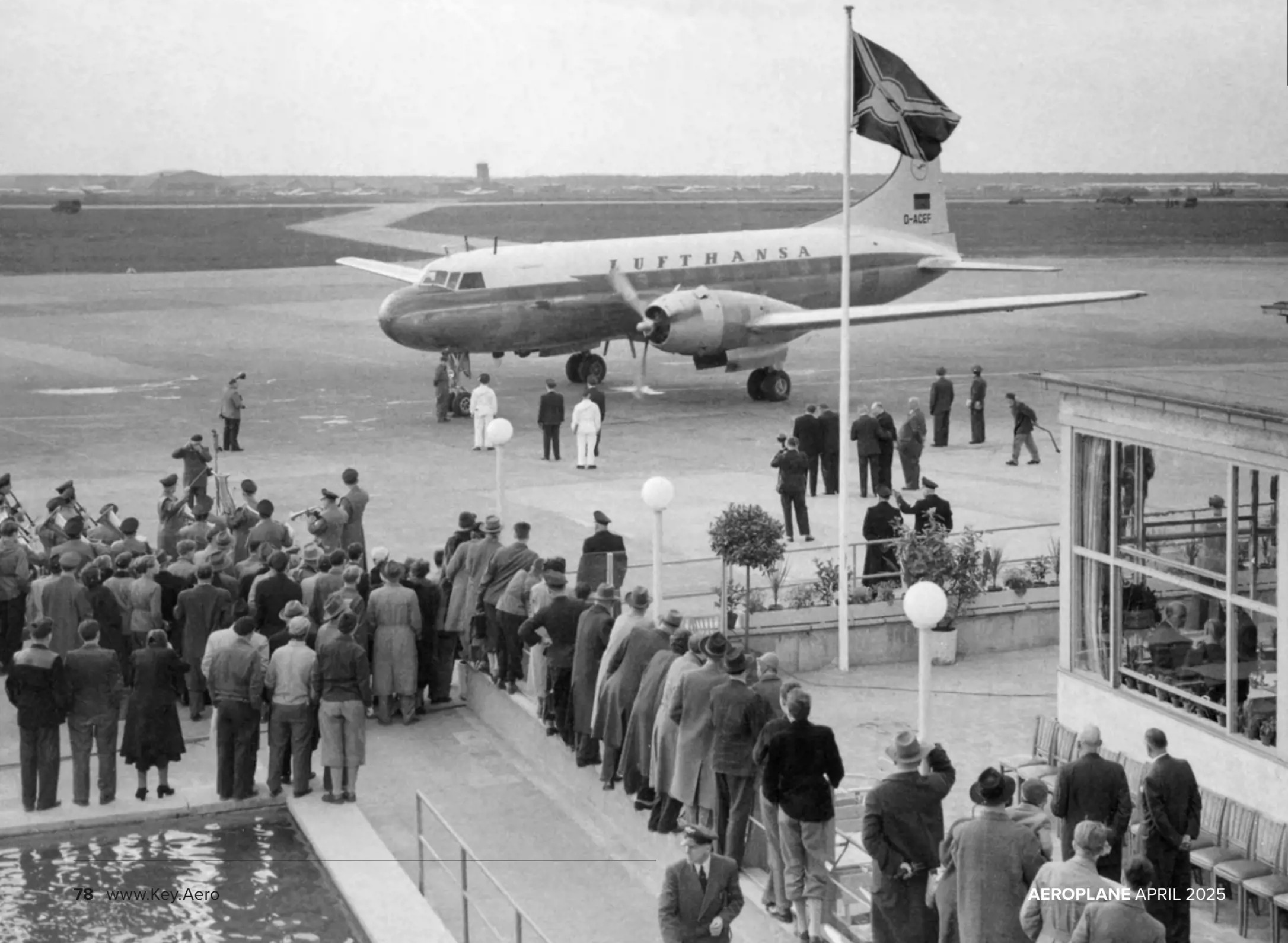
The Germans were, seemingly, anxious to steer a middle course: buying aircraft in America and seeking crew instruction in Britain. One, self-evidently, was more lucrative than the other. But the British wanted to keep themselves in the picture, and at the beginning of January 1954 an agreement was reached whereby Luftag aircrews would go to Air Service Training at Hamble. *Flugwelt* magazine reported that the pilots — Walter Blume, Herbert Topp, Johannes Rathje and Rudolf Mayr — already had 40,000 flying hours between them, adding how 11 others had been flying CV-240s, DC-3s and DC-4s with Swissair, which was not subject to the Allied bans on German flying activities, for the past two years. Further groups would follow the first cadre to the UK.

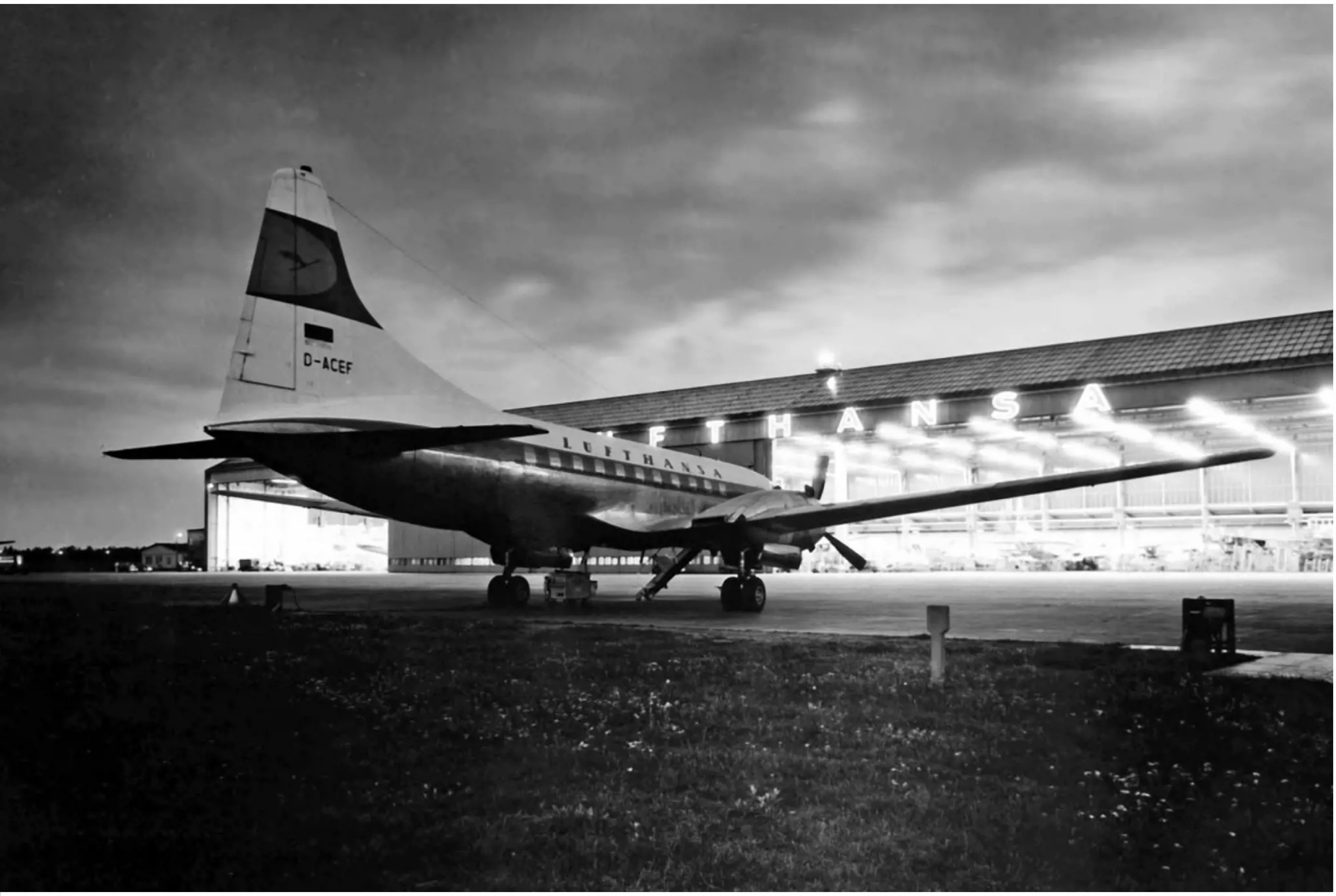
◆

The initial quartet, in turn, proceeded to San Diego in July 1954 to start training on the CV-340. But the airline was unable to take delivery of the aeroplanes until a relaxation of the occupation laws allowed, and that took longer than expected. The government in Bonn asked the Allied High Commission to waive the prohibition on West German aviation, which met with positive responses from Washington and London. Paris, however, was more circumspect. Its view was that a decision had to depend on the European Defence Community treaty, otherwise known as the Treaty of Paris, being ratified by the French parliament. As a report in the US military newspaper *Stars and Stripes* said, "Permission for Germany to resume aviation is contained in the peace contract which is linked with EDC."

One by one, the obstacles were being removed, the birth pangs overcome. Maintenance facilities began to be set up at Fuhlsbüttel during 1953; that December, a long-term contract with the airport authority followed. An important decision still lay ahead, though. On 6 August 1954, the board concluded that Luftag should be renamed as Lufthansa. Buying the rights to its name, symbol and flag cost 30,000 Deutschmarks. Crucially, though, this was in legal terms an all-new Lufthansa, not a continuation of the old original. In the wake of the war, such a distinction was crucial.

It all became that bit more real on 29 November 1954, when the initial two CV-340s arrived in Hamburg. With the American captains of


BELOW: The inaugural day of commercial services, 1 April 1955, and CV-340 D-ACEF calls in at Frankfurt en route between Hamburg and Munich. ALAMY



ABOVE: **The impressive Hamburg maintenance base was up and running in time for the carrier's first operations.**
LUFTHANSA

D-ACAD and 'ACAH were Walter Blume and Rudolf Mayr, both ready to occupy the left-hand seat themselves once the Allies permitted. The wait for approval at least gave maintainers at the Fuhlsbüttel base a few months to acquaint themselves with the ins and outs of the Convairs before the daily commercial grind began. And there was what today would be dubbed a 'soft launch', with non-passenger-carrying proving flights — on which British captains joined German co-pilots — taking place from March 1955.

It was under a special dispensation from the Allied High Commission that 1 April 1955's inaugural passenger services took place, as the two CV-340s made almost simultaneous take-offs from Munich and Hamburg, each heading for the other city with two intermediate stops. In the cockpit of the Frankfurt, Cologne and Hamburg-bound machine — airborne, it's said, just a minute earlier than the aeroplane for Düsseldorf, Frankfurt and Munich — was Kurt Schultze, who'd flown for the pre-1945 Lufthansa, but now said, "We've had to completely relearn". Like his German colleagues, he was temporarily relegated to the role of co-pilot. No wonder he told the news magazine *Der Spiegel*, "It's as if someone who has written with his right hand for years is suddenly supposed to write with his left hand."

> ***"The Frankfurt station manager and his assistant sat on boxes"***

Even for individuals with as much prior experience as they had — and despite their recent refresher training — the post-war civil aviation world was, reportedly, rather alien. "Voice communication [...] has presented the old Hansa captains with the greatest difficulty to date", said *Der Spiegel*, "because it is conducted in English everywhere. Even on the first flights it became apparent that even those with a gift for languages needed a long time to fully understand the short instructions peppered with codewords that squawk from the loudspeaker and are almost drowned out by the noise of the engines". It quoted Capt James Monroe, a British European Airways pilot who commanded the maiden Hamburg-Munich service, as saying, "The German boys were pretty lost in the first few days."

There were, however, ways in which things remained somewhat primitive. According to one reminiscence, "The station manager in Frankfurt, for example, had a provisional office in the hangar. The furniture consisted mainly of a table that had been nailed back together, a typewriter, a cash-box with precious little money, some files and a few forms. The station manager and his assistant 'resided' on upturned boxes. Such was the pioneer era at the new Lufthansa..."

RIGHT: Rudolf Mayr and Walter Blume were on the flight deck of Super Constellation D-ALAK for this test flight. Sadly, this was the aeroplane involved in the post-war Lufthansa's first fatal accident when it crashed on approach to Rio de Janeiro's Galeão Airport on 11 January 1959, killing 36 of the 39 people on board. GETTY

LUFTHANSA
D-ALAK

The first post-war Lufthansa timetable included only destinations within the Federal Republic — four routes in all, between Monday and Friday. But when West Germany regained its sovereignty from the Allies on 5 May 1955, and thus took back control over its own airspace and aviation activities under the terms of the Bonn-Paris conventions, the situation changed. Flights with the Convairs to Paris, London and Madrid all commenced in mid-May, and Lufthansa no longer needed specific permission to operate; it could again function like almost any other national airline. Almost, because it was not permitted to fly into one major city in its homeland. This was West Berlin, an 'outpost' of the Federal Republic within East German territory, and subject to special status owing to its particular situation. For a long time, only certain airlines of the western Allies were permitted to operate there. Lufthansa would return, but not for another 35 years.

Long-haul operations were on the agenda, though, thanks to the Super Constellations. The first, D-ALEM, had been delivered on 19 April 1955. It began flying the North Atlantic route from Hamburg to New York's Idlewild Airport on 8 June, a 17-hour trip via Düsseldorf and Shannon. Schedules to South America and the Far East would follow. Lufthansa's L-1049s were also used by German government officials on lengthier overseas trips, such as Chancellor Adenauer's September 1955 visit to Moscow. The 'Super Connie' captains all came from TWA initially, an all-German flightdeck contingent not taking the helm until March 1956.

The airline was proud of its then flagships. It trumpeted how it had specified its own on-board kitchens, offering silver-service meals on Nymphenburg porcelain, with German food and drink central to the menu. No other carrier, Lufthansa proclaimed, served freshly brewed coffee or baked bread rolls on flights across 'the Pond.' Such details were key to gaining trans-Atlantic market share from more established rivals. Having taken out so much credit in the course of starting up, profitability really mattered.

That took the best part of a decade to achieve. Once the new Lufthansa had a year of commercial operations under its belt, it employed around 1,100 people and had carried some 104,000 passengers on services using 12 airports. These were pioneering times in a re-emerging nation, but successful ones too. In West Germany's renowned economic miracle, the Wirtschaftswunder, its national carrier was both a prominent symbol and an important contributor. And the foundations for that had been laid through the approach taken when the company was still an airline without aircraft.

BELOW: In front of the old Frankfurt terminal, a CV-340 sits between flights. Selection of the Convair twin was based in part on the financial package via which it was offered, but it was also felt to be more of a known quantity for the start-up airline compared with the Vickers Viscount, which did end up in the Lufthansa fleet, but not until 1958. LUFTHANSA

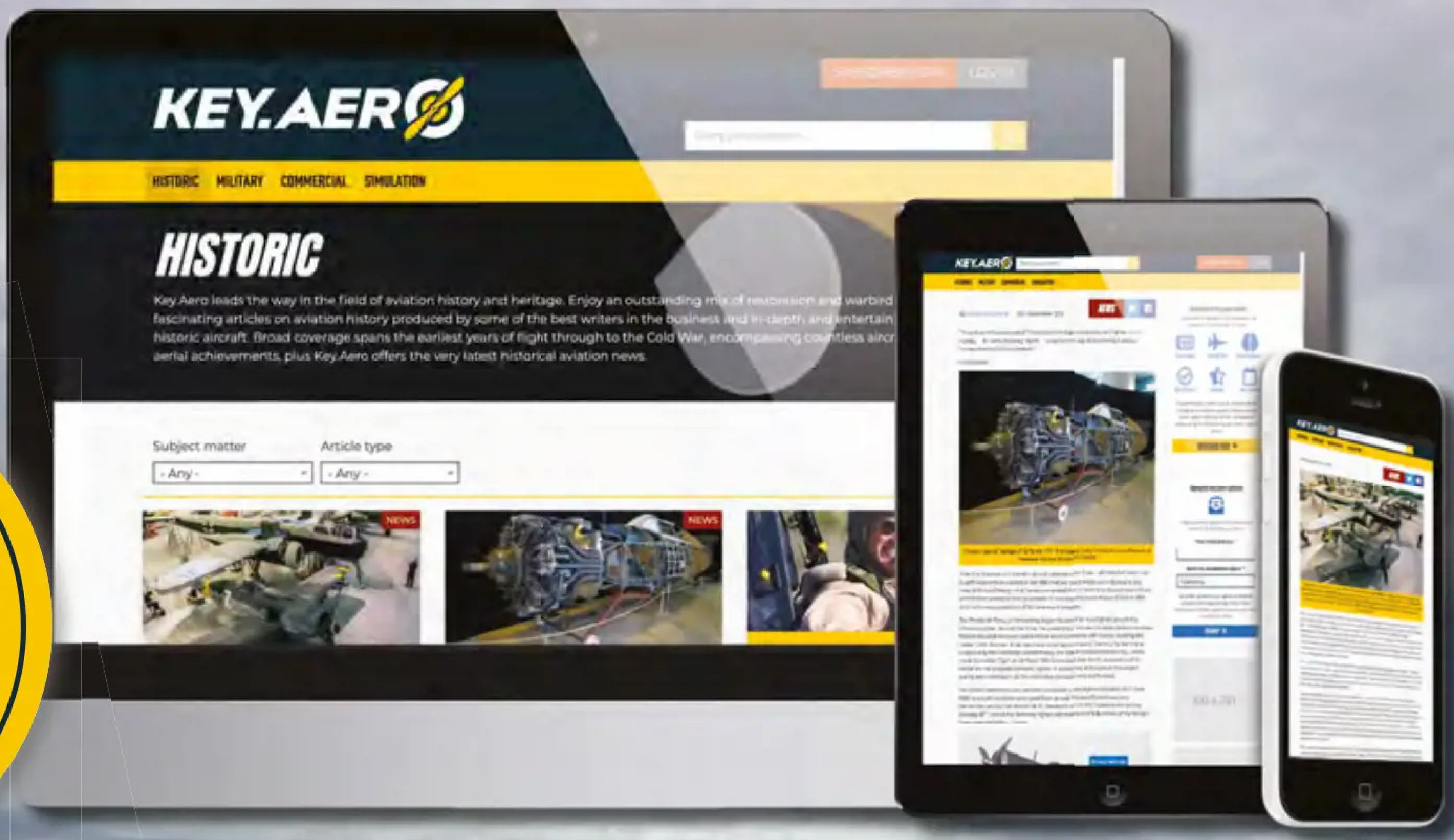
FRANKFURT MAIN
LUFTHANSA

KEY.AERO

The World's Fastest Growing Aviation Website

Join us online

SUBSCRIBE TODAY!


KEY.AERO
HISTORIC
MILITARY
COMMERCIAL
SIMULATION
HISTORIC
Subject matter
Article type
NEWS

"In-depth content and high-quality photography" Stew

"Well worth the money" Andy

"A great place for aviation geeks!" Kenneth

GREAT REASONS TO SUBSCRIBE

- In-depth articles, videos, quizzes and more, with new material added daily
- From historic and military aviation to commercial and simulation – *Key.Aero* has it all
- Exclusive interactive content you won't find anywhere else
- A fully searchable archive
- Access to all the leading aviation magazines
- Membership to an engaged, global aviation community
- Access on any device – anywhere, anytime

Subscribe FROM JUST £5.99 for unlimited access

497/21

AEROPLANE meets GAVIN TRETHEWEY

He flew film of the moon landing to New Zealand and was among the first people to see the sun rise on the 21st century — this historic aircraft stalwart has made the most of a long career

WORDS: BEN DUNNELL

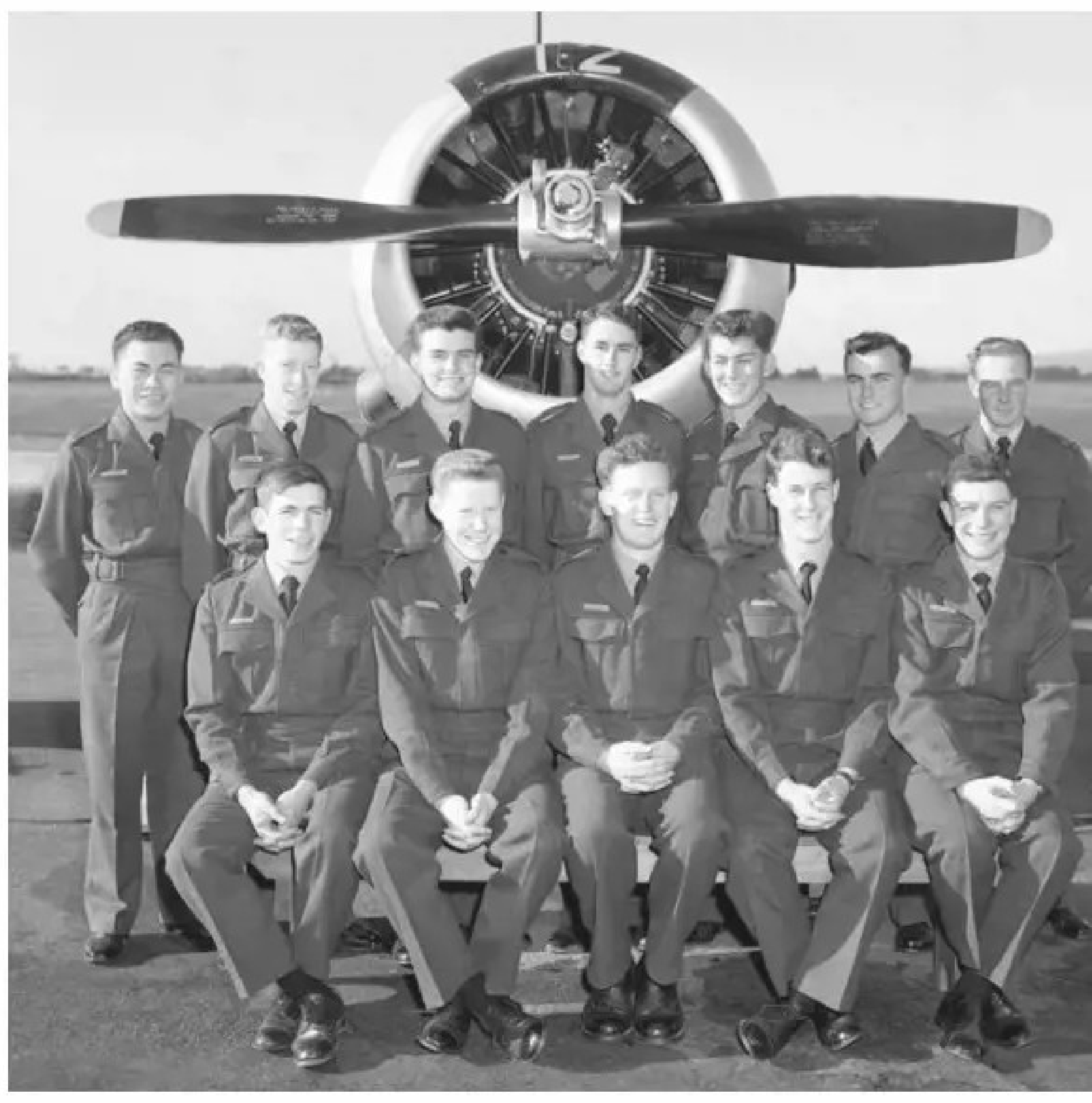
A quarter of the way into the 21st century, it's hard to credit that there are still very active pilots who began their training on Tiger Moths when they were still relatively contemporary. What a splendid grounding that gave them, starting out in a biplane that engrained the fundamental principles of real, old-fashioned, stick-and-rudder aviation from the outset, challenging their airmanship skills in a way no modern aircraft can ever quite match.

Gavin Trethewey has good reason to be grateful for those formative days. They took him onward to a fine career in the Royal New Zealand Air Force, during which he played his own small part in one of the most significant world events of all time, and then with his country's national carrier. But beyond that, as New Zealand's historic aviation scene began to develop in earnest, he was able to bring those experiences to bear, both through his own flying and passing them on to others.

Today this friendly fellow is in his mid-80s, and while he's now retired from warbirds — both Second World War types and the First World War machines that have burgeoned in New Zealand — he's still very much a recreational aviator. Gavin's very sharp recall takes us right back to childhood, when the *Biggles* books were a significant influence. "I joined the Middle District Aero Club at Palmerston North at age 16 and went solo that same year, in a Tiger Moth. I think I was earning £7 10s a week, and it cost me £3 10s an hour to fly in the Tiger Moth dual and £3 solo, so I could only manage about half an hour a week. After about five hours of dual, paying the extra 10s an hour for the instructor, they let me go solo so I could save that 10s.

"I got my private pilot's licence in 1958, and having done that I joined the air force in January 1959, on my 19th birthday. The first six months were officer training, the typical air force thing, marching round the square and learning all about meteorology, the principles of

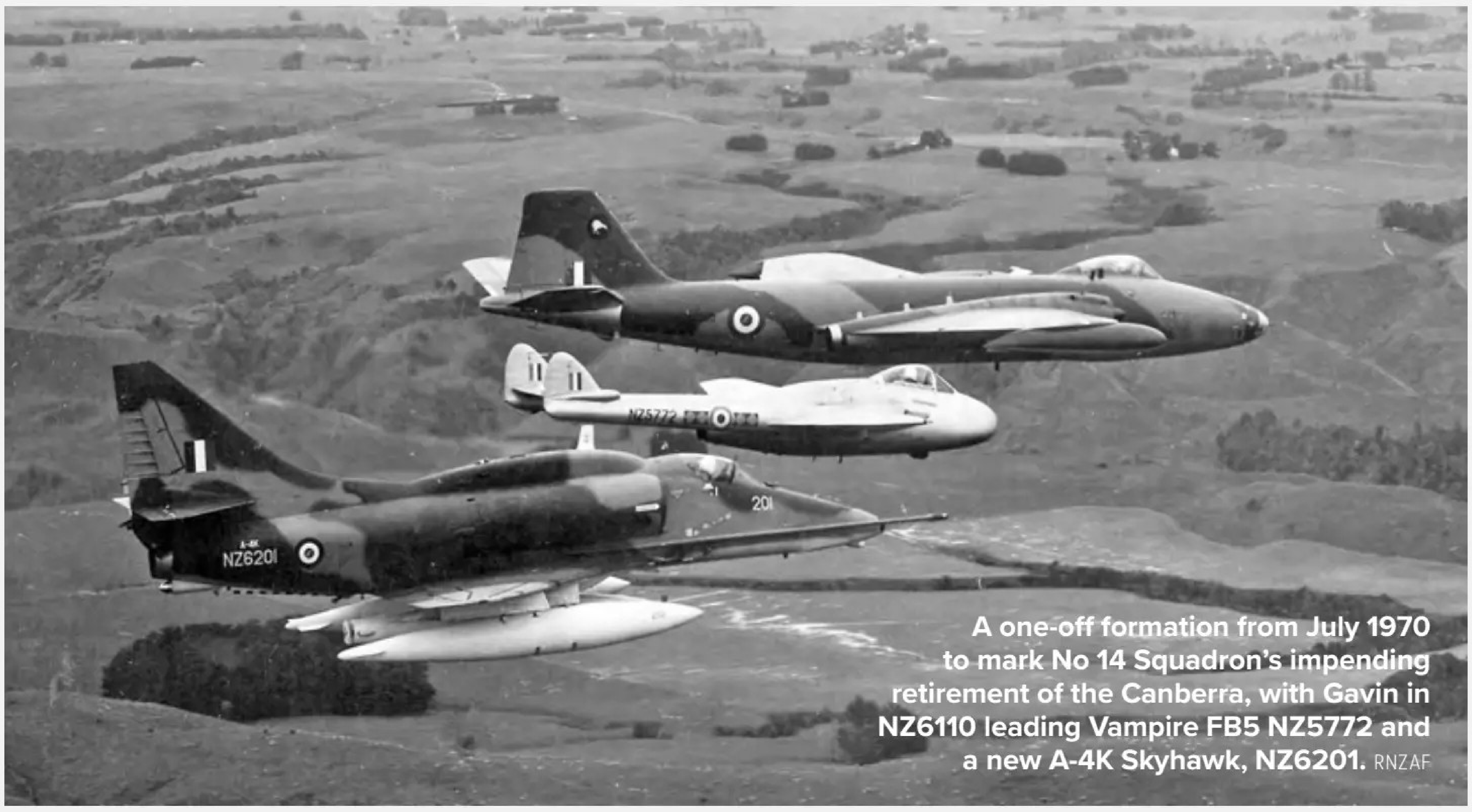
Taking World War Two veteran Alan Peart DFC for a flight in Doug Brooker's Spitfire IXT. Peart flew the type in the European, Mediterranean and Far Eastern theatres, shooting down aircraft of all three main Axis powers and claiming six confirmed kills. GAVIN CONROY



The members of No 30 Pilots Course at Wigram in 1959. Gavin is third from right in the back row. RNZAF

Facing the limelight on 21 July 1969, having just arrived at Wellington's Rongotai airport in Canberra B(I)12 NZ6102 of the Strike Support Unit with film of the first moon landing on board. On the right is Gavin's navigator, Sqn Ldr Mike Hill. RNZAF

The CFS's Red Checkers team of Harvards on a 1966 practice flight from Wigram, signed by the pilots.
VIA GAVIN TRETHEWEY



A one-off formation from July 1970 to mark No 14 Squadron's impending retirement of the Canberra, with Gavin in NZ6110 leading Vampire FB5 NZ5772 and a new A-4K Skyhawk, NZ6201. RNZAF

flight and that sort of stuff. They were training on Harvards, so that's what I went onto after six months when we got on to flying, which was fairly intense. We started off with simple day flying, learning how to stall and spin, followed by formation flying, night flying, cross-country flying and so on, until we reached an air force standard. I have to say, the first time I went dual in a Harvard I thought they'd let an elephant go madly loose on me. It seemed such a big beast, and it took a while to adapt to it. But I adapted, and I graduated with my wings in May 1960.

"The Vampires were still hanging around, calling themselves day fighter/ground attack. Straight after the wings course I went through the Vampire conversion at Ohakea, and at the end of July they told me I'd qualified as a day fighter/ground attack pilot, though I don't know how skilful I was at that point in time. It was really a training aeroplane… But the single-seater, the Mk5, in particular was lovely.

"I went on a multi-engine conversion course flying Devons with No 42 Squadron, just for a couple of months to get the hang of what it meant to have an engine on each wing. Then I got on the Bomber Operational Conversion Unit, which was the Canberra conversion unit, on the Canberra T4. On first acquaintance, I loved it. I have to say the training version, the T4, and later on the T13 which had two ejection seats side-by-side had not a lot of room for the two pilots, and the view, because of the way you were pushed to the outside of the cockpit, wasn't particularly good out the front. But at the end of my conversion they put me onto the B(I)12, which was fantastic with a fighter canopy offset to the side, and gave you a great view.

"Once I'd graduated on the Canberra, they sent me to RAF Tengah in Singapore on the Canberra B2 with No 75 Squadron. We were flying high-level bombing, and 30 per cent of that was at night, which was a good education. The aeroplane didn't have an autopilot or anything like that, so you got used to hand-flying at night. I also had a flight in a Javelin when I was at Tengah in April 1962 with a Flt Lt Arthur… I enjoyed it. Did some aeros, went sonic, and experienced the braking power of those mighty airbrakes when extended at over 500kt.

"Eventually No 75 Squadron folded; the aeroplanes were on lease from the RAF and we flew them back to the UK. In mid-1962 I was sent back to Ohakea where No 14 Squadron had formed with the Canberra B(I)12. Out of my 12 years in the air force I flew the Canberra for about eight. In the B(I)12 we were in the low-level role, so we were charging round at a couple of hundred feet a lot of the time. The B(I)12 carried the same internal bomb load as the B2, but we also had two bombs or 74 rockets under the wings, so our training involved firing the rockets as well as bomb-dropping, which we mostly did at a couple of

Starting up Canberra B(I)12 NZ6106 at Ohakea on 1 May 1970 for its flight to BAC's Samlesbury facility in the UK. The aircraft ended up being left there and scrapped. RNZAF

LEFT:
A throng of personnel gathers in front of a Canberra, either NZ6111 or NZ6109, before its departure for India.
RNZAF

the ranges in New Zealand. The training was good.

"We operated with the RAF Far East Air Force quite a bit. We would go to Singapore and position at Tengah, and when Sukarno [the Indonesian leader] became a bit aggravated about the formation of Malaysia and started pressuring the Malaysians in 1963, we were moved to Singapore to join the RAF squadrons there, really just to scare him off. I was up there for nine months at that stage."

Assignment in 1965 to the Central Flying School as a Harvard instructor was Gavin's introduction to display flying. "Someone said that as I had a lot of formation background, I'd better join the CFS Harvard aerobatic team. We were a five-aeroplane team called the Red Checkers, and we displayed round the country. But after 18 months of that I was posted back to Canberras as an instructor, and once I'd been there a few months I got the job of displaying the Canberra. I think I did 23 different airshow displays from 1967-70.

> ***"You could aerobat a Canberra within reasonable limits"***

"The Canberra was a 4g-limit aeroplane, and we decided we could display it within that, so long as we didn't hit bumps at bad times. My typical display — for which we only carried brave volunteer navigators — was to get airborne, hold it down low, put the gear up, reach 190kt and, with the gear clean, start a pull-up and go over the top. I'd be aiming for a 3g pull-up, and to help me make that 3g limit the ground engineers had taken out the gunsight and put an accelerometer up in front of my face so I could watch the needles and see how much g I was pulling. Going over the top of the half-loop, the speed would go back to 70-80kt, not pulling any g. I'd start pointing it downhill, roll out of that and do a high-speed pass. I could fly a power-off loop, starting at 400kt and chopping the power. You could aerobat it within reasonable limits, pretty much keeping the g under control."

It was during his second tour with No 14 Squadron that Gavin enjoyed a particular moment in the limelight. The date was 21 July 1969, and the occasion one that's gone down in world history: the immediate aftermath of the Apollo 11 moon landing. "New Zealand didn't have the ability to have film transmitted across the ocean like we have today. The only way to get film to a New Zealand audience was to pick up a reel of it and carry it. The New Zealand Broadcasting Corporation was very keen to get it could any film of the moon landing as quickly as possible, so the New Zealand people wouldn't be left behind in their knowledge of what was going on. A lot of the film of the landing was sent back to the Parkes telescope in Australia, so the Aussies had it.

"The Canberra was the fastest aeroplane we had that could get into Wellington Airport — it was too short for the other jets. I got given the job, and that morning I flew

LEFT:
The Roaring Forties team of 1995, in which Gavin was number four. With him are John Lamont, Steve Taylor, John Peterson and Keith Skilling.
VIA GAVIN TRETHEWEY

ABOVE: Still a great spectacle, no matter how often you see the pictures: the seven-ship Fokker Dr.I replica formation staged at Omaka in 2007.
GAVIN CONROY

with a navigator, Mike Hill, across to Sydney to pick up a reel of film. As soon as Neil Armstrong, Buzz Aldrin and co were all down on the moon, the Parkes telescope had sent it to Sydney, where it was put on a reel for us and raced out to Sydney Airport. We put the film into the aeroplane and headed off at high speed — as high a speed as we could in those days — for New Zealand.

"We landed at Wellington in the dark, round about 7pm. We were met by all sorts of flashing lights, which were police and customs and news people. They weren't interested in us… they just wanted to race the film off to the television studio. Anyway, it got on the news at 7.30, and we actually made a record between Sydney and Wellington airports, two hours 24 minutes."

A far longer trip in 1970 saw Gavin captaining Canberra NZ6106 on a flight to the UK, with navigator Hamish Gray. "They'd found a crack in the main spar of the aeroplane. It was unable to be repaired in New Zealand, but they looked at it and decided it was safe to fly in a limited manner to the UK, back to the British Aircraft Corporation to see if they could fix it. We set off with a light fuel load and full instructions to avoid all the weather and not hit any bumps if we could avoid them. It took us eight days, because we flew very short legs and made lots of stops. It was interesting to go through places like Karachi and Tehran. Finally we got the aeroplane into Samlesbury, where BAC looked at the crack and couldn't fix it either. It was pushed aside and we never got it back.

> *"I had to tell Ray Hanna, 'You can't do that here, mate!'"*

"No 14 Squadron's Canberras wrapped up in mid-1970 and went into storage, but then the Indian Air Force decided it wanted to buy them, so we had to get the aeroplanes out and prepare them for a transit to India. I was given the job of running that. There was myself, a couple of other pilots and three navigators. We did the first one in November 1970, flying them to Bangalore. I took four of them and the other guys took the rest — I did the last one and got home on Christmas Eve 1970. When I got home I threw my uniform in the rubbish bin and that was the end of my air force career.

"I was looking for a job, and airlines weren't hiring very much. I went to Qantas, and they hired me and then changed their mind and said they were laying people off, not taking them on. Cathay Pacific said they liked my twin-jet time but they'd rather it had been with swept-back wings rather than straight ones. In the UK I talked to British Airways, and they were interested, and I went to the RAF. They said yes, they'd hire me, and they offered me a nine-year commission flying Phantoms or Buccaneers. I thought that sounded pretty damn good, so I went home to pack up and get the family ready to go. Lo and behold, as fate had it, I was stricken with appendicitis and peritonitis and carted off to hospital. I had to write to the RAF and say, 'Sorry mate, can't be there for a while...' They said, OK, take your time.' Then while I was in hospital I had a message from Air New Zealand saying, 'Do you want to work for us?' I thought I might as well."

The course of his life duly altered, Gavin started at Air New Zealand as a co-pilot on the L-188 Electra, followed by the DC-8 and DC-10. He upgraded to captain on the Boeing 737, moving up to the 747-200 and 767. The last decade of his time with the carrier was spent on the 747-400, which allowed him to do something special to mark the new millennium. Volunteering to take the helm for a service between Los Angeles and Auckland, he and the navigation department worked out how those on board could be the first people in the world to see the sun rise on the 21st century. Through careful calculations, they did it, and Gavin's wife was among the passengers. Later that year he hit the ANZ compulsory retirement age, but that was still only 60, so he went to work for its subsidiary Freedom Air as an instructor captain on 737-300s.

He'd hardly have been sitting around kicking his heels, however, because by then he was very much embedded in the historic aircraft scene. The purchase by Trevor Bland and Stan Smith of Harvard NZ1092 back in 1978 was a significant event, leading to the establishment of the New Zealand Warbirds Association. Usually referred to as NZ Warbirds, or simply Warbirds, it grew into an 'umbrella' body for the industry. "I was hanging around on the edges then", says Gavin. "I didn't get seriously involved until about 1990. After that I started getting jobs with Warbirds of one sort or another.

◆

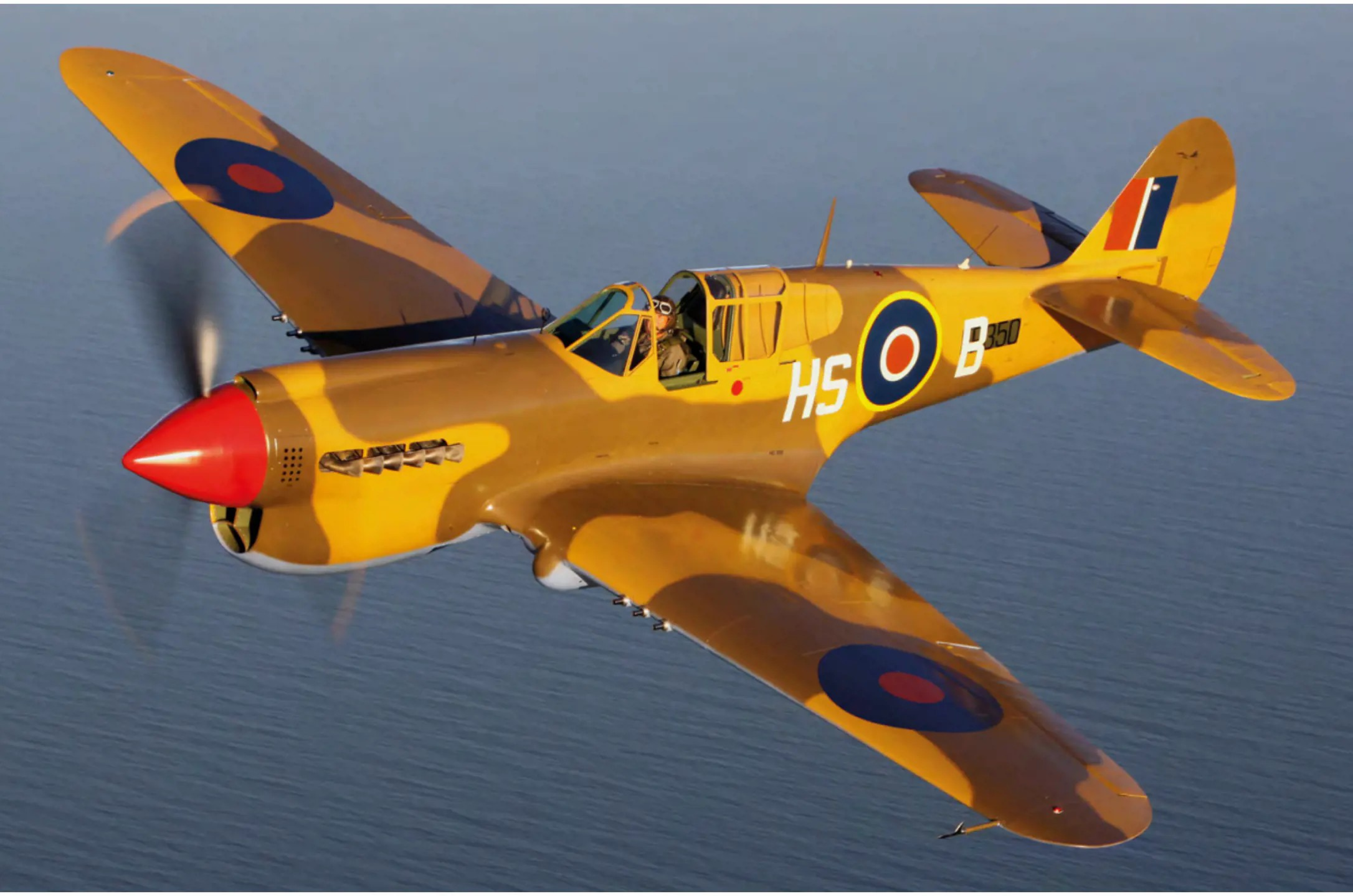
"In 1992 I was persuaded to join the Roaring Forties Harvard team, and I flew for them until 2010. They made me chief flying instructor of NZ Warbirds in 2001, and I did that until 2007. From 2005-08 I was a display director, involved with all the displays around the country. I became operations manager from 2007-15, and I was the president from 2007-11.

"We have an approval from Civil Aviation here to monitor and sign off the standards at airshows, so every display pilot in New Zealand had to get an authorisation from us that they were competent to fly a display, and then we monitored them and reported on them. Even display pilots who came from overseas have to get approved — people who were far more experienced than me, like Ray Hanna. I had to give him an approval to fly in a display, which amused me a bit. The minimum in New Zealand was 100ft, and Ray showed me his British authorisation which was 30ft. I had to say, 'You can't do that here, mate!' I'm sure he did a few feet less than 100..."

As the CFI for Warbirds, he enjoyed the opportunity to fly many different New Zealand-based types, both piston and jet-powered. When film director Peter Jackson got involved in having superb World War One reproductions built, through what became The Vintage Aviator, Gavin soon became one of the pilots. "The aeroplanes Peter Jackson was producing were going to Masterton airfield. I'd done some shows at Masterton and we were well connected to the people there, so I was asked if I'd be interested in going down there and flying with a group of other fellas. They were just asking reasonably experienced display people to have a go in the aeroplanes.

"The first one I flew was the Fokker Dr.I. Every few weeks we used to get together and have a day or two down there, getting them out and going flying. Then we went on to do displays with them. In the Triplane I ended up doing 21 displays around the country, and at one of those" — the 2007 Classic Fighters show at Omaka — "we had seven of them, which was the largest formation of Dr.Is since World War One. Great aeroplane for pulling tight turns and dogfighting, but quite unstable, which I suppose made it a good fighter aeroplane in some ways.

LEFT: P-51D Mustang ZK-TAF was painted as an RNZAF aircraft, NZ2415, though it had no Kiwi heritage. Here, Gavin's flying the fighter while it was in Graeme Bethell's ownership, with Spitfire MH367 for company.
GAVIN CONROY



ABOVE: A test flight in the P-40N Kittyhawk destined for Vintage Wings of Canada, following its restoration by Ardmore-based Pioneer Aero.
GAVIN CONROY

"The BE2c was a gentle aircraft. It sort of waddled along at 60-70mph. I remember delivering the Avro 504K from Taupo, where we'd had a show, over the hills to take it to Hastings; obviously there was a bit of a headwind, and my hand-held GPS let me know that we were only doing about 30mph. The Bristol Scout was a lovely little aeroplane and introduced me to a rotary engine, and was an exercise in learning about rotaries and how you control the engine rpm, which was quite different from anything else I'd done. The later aeroplanes like the SE5a were really a step up. I had some really good flights in the SE5a — it was quite a performer and would out-fight the Fokker, no trouble at all."

Of the prime Second World War fighters, Gavin has flown the P-40N Kittyhawk that was owned by Liz Needham and Frank Parker, as well as flight-testing the example destined for Vintage Wings of Canada. Then there was P-51D Mustang ZK-TAF, one of New Zealand's longest-standing warbirds. "It was owned by two guys, and I was responsible for giving them clearances for air displays. I put it to them that it would be a good thing if I knew how to fly the aeroplane. We didn't have any two-seat capability to do it, so I did my book study and then Trevor Bland stood on the wing and watched me start it up to make sure I knew what I was up to. Then I went flying, and I flew it quite a bit after that."

> ***"There's been tremendous growth and interest in warbirds here"***

Not as much, though, as Spitfire IXT MH367. When it was in the ownership of Doug Brooker — who only recently sold the two-seater to Ultimate Warbird Flights in the UK — Gavin performed displays in the aeroplane and took more than 200 paying customers, visiting from around the world, up in it for rides. The highlights were trips with 92-year-old veterans Alan Peart and Jim Robinson. "Neither of them had flown in a Spitfire since World War Two. They both had a lot of Spitfire experience. Their families brought them up to Ardmore, and we celebrated the fact that they could go. It was wonderful to take these guys for a ride — they both had tremendous knowledge.

"I remember flying with Alan and saying, 'You know how to fly a Spitfire.' He said, 'Oh, I'll have a go.' 'OK, you have control.' So, he had control of the aeroplane and he was flying at 1,000ft down the coast, and he kept turning from side to side. I asked, 'Do you know how to fly this thing straight, Alan?' He replied, 'You fly straight and the Hun'll get you.'"

It was only a couple of years ago that Gavin took the Spitfire into the

LEFT: **Walking in with fellow pilot Gary Yardley after a flight in one of The Vintage Aviator's stable.** GAVIN CONROY

air for the final time. That aircraft — since sold to Ultimate Warbird Flights in the UK — had been among the especially prominent indicators of New Zealand coming into the centre of the warbird world. "There's certainly been tremendous growth and interest here", he states. "You have to put it down to a few very enthusiastic people, who took some of the specialties on their shoulders — people like Trev Bland, who really got things started… I think the shame now, though, is that while the warbird scene is doing pretty well, it's been a sad year for us here at Warbirds in that the P-51, the P-40 we had in the hangar and Doug Brooker's Spitfire have all gone. We can't find enough millionaires in New Zealand to buy these things."

Against that, the strength of the country's warbird restoration business shows no sign of diminishing. "It's been tremendous. The two I'm very familiar with at Ardmore, Avspecs and Pioneer Aero, have done great work. It amazes me — the guys doing it are tremendously good engineers, and among them are quite a few young fellas who could probably make a lot more money by going to work for Qantas or Air New Zealand, but they're enthusiastic about their tasks. I just think they do it all so well."

◆

And what of the pilots — does Gavin see any difficulty in bringing forward the next generation? "It's always been a worry, but we do currently have quite a good selection of younger guys. We try to encourage them". The same is true for those who don't necessarily want to fly, and the Warbirds museum facility at Ardmore offers various relevant opportunities. "The trouble is", he says, "that they get keen on getting involved in these things and then they go off to get married and have a mortgage. That means they can't afford anything until they're about 50, when they come back."

Gavin is still coming back, being involved as he is in the restoration to static display condition of a Canberra. "When we sold our B(I)12s to India, unfortunately we didn't even retain one. That's been regretted by people who were senior at the time. So, we were always looking for one which was pretty much the same. The Air Force Museum in Christchurch found one in the UK, a B(I)8 which had flown in Germany, which in exterior features was pretty much the same as our B(I)12s. They brought it out to New Zealand with a view to restoring it, but after 25 years they hadn't done anything, so we at NZ Warbirds thought it was something we could do". A loan deal was done, and the aircraft, serial WT346, was transported to Ardmore in early 2020. The work is being done by the Canberra Support Group, which has already finished the fuselage to a high standard and is now tackling the wings. When complete it will become an exhibit in the Warbirds museum.

In flying terms, things came full-circle last year. "When I'd flown the Harvard for 50 years, Warbirds put on a little evening for me, and my family and friends were all invited to see it. Of course, I got way past 50 eventually. The final number was 65 years, 1959-2024; I did my final Harvard display in March last at a Warbirds open day event. After that I thought it was about time I gave way to the younger fellas. I was 84 at that stage". But he still very much enjoys his Vans RV-6, and looks forward to carrying on in that vein.

There's so much for Gavin to look back on, having started his flying training when he was in his mid-teens, just over a decade after the war finished, and still aviating an incredible 69 years later. "It's been tremendous to have done it for so long", he reflects. And so say all of us.

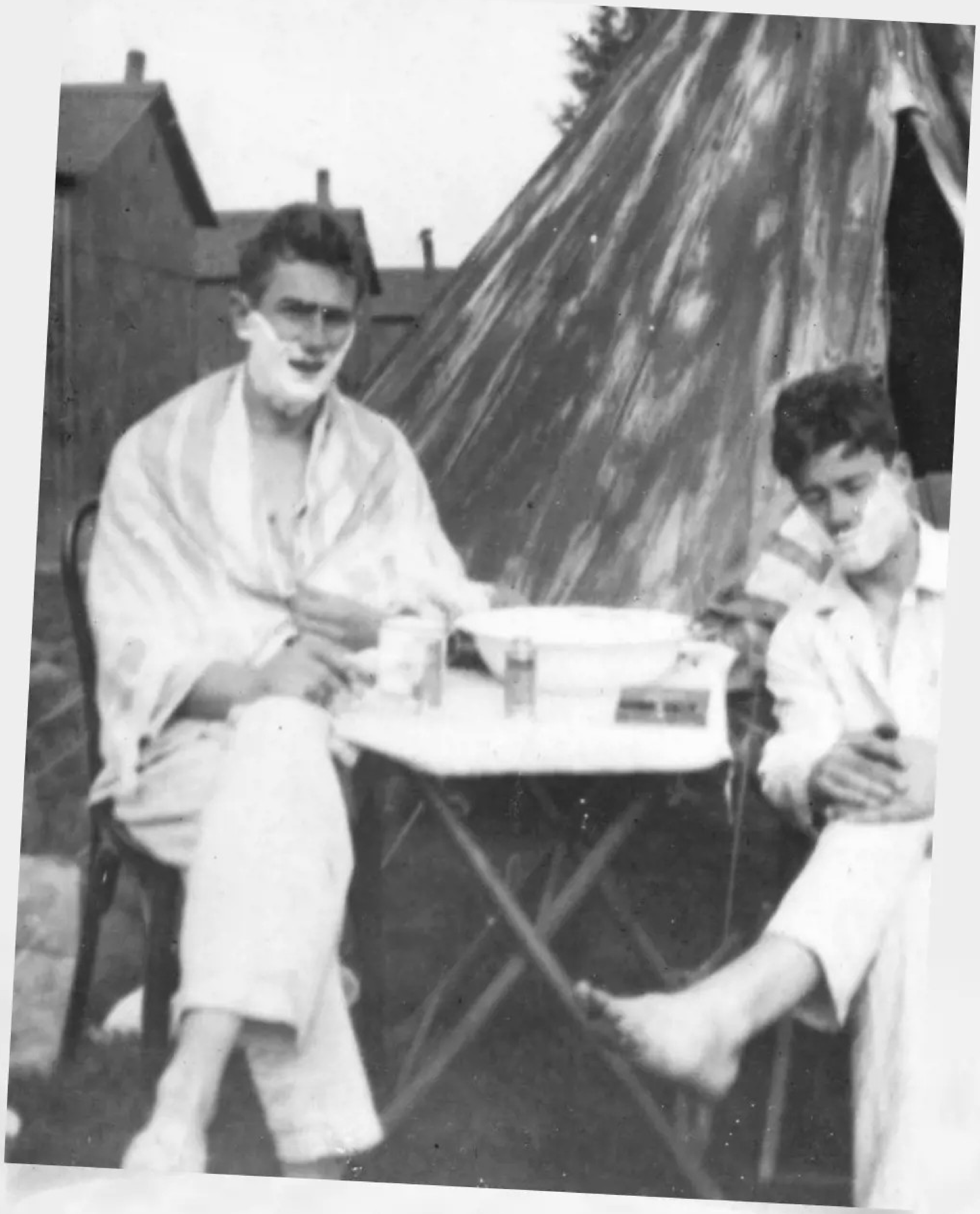
RNZAF
92
WAR
AR

LEFT: **Harvard III NZ1092/ZK-WAR being displayed by Gavin during one of his last shows as a pilot. In the end he racked up in excess of 300 public displays.** GAVIN CONROY

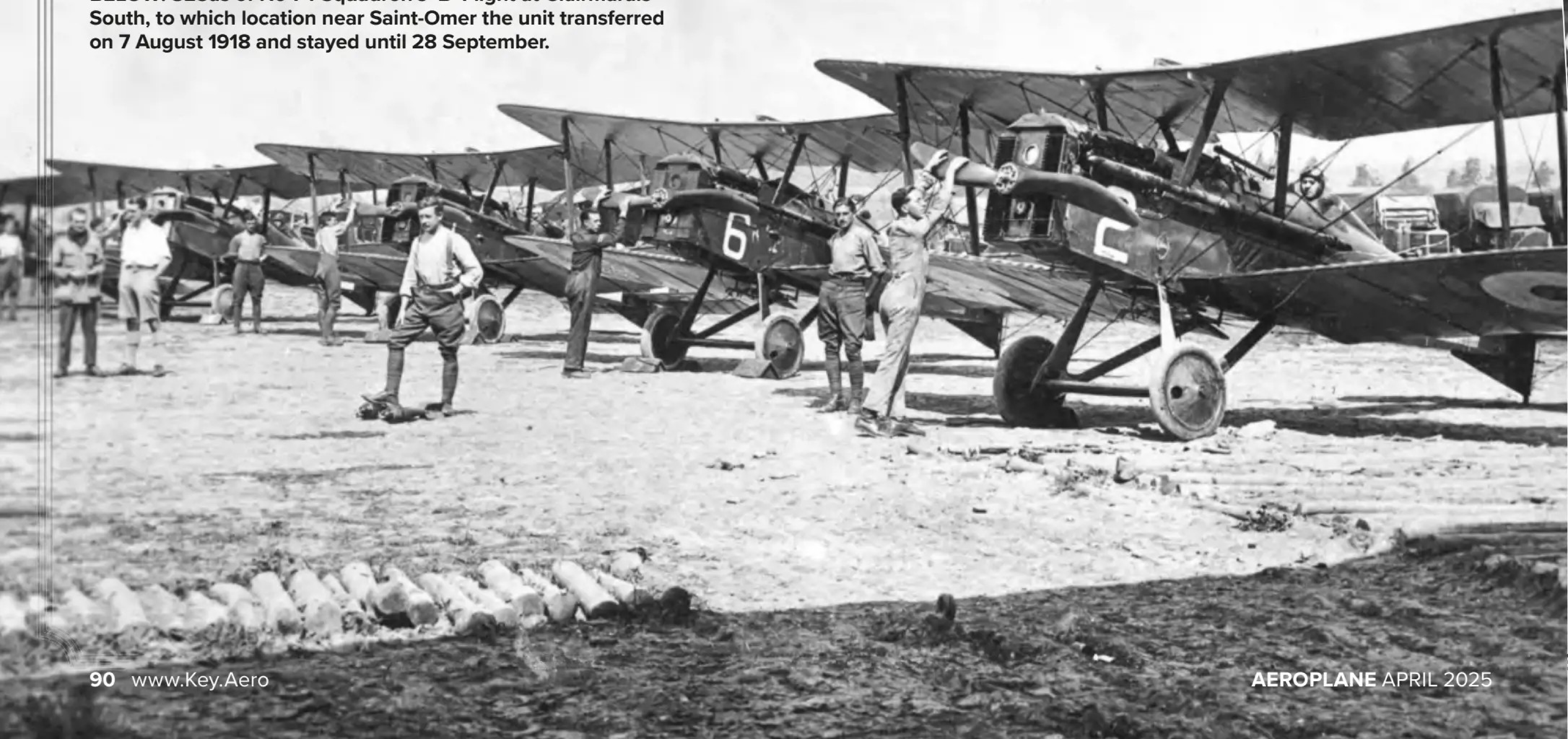
‘GRID’ CALDWELL

IN WW1

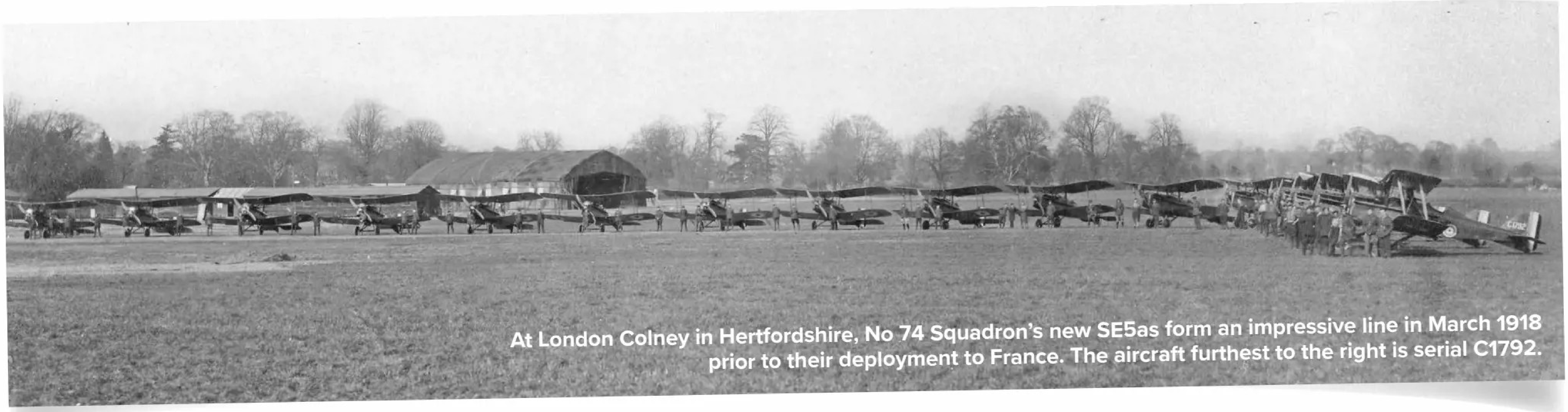
New Zealand aviators come little more illustrious than **Keith ‘Grid’ Caldwell**, who came to Britain in 1916, joined the Royal Flying Corps and flew with No 60 Squadron before joining the SE5a-equipped No 74 Squadron as its commanding officer. The future inter-war commander of the New Zealand Territorial Air Force, who retired as an air commodore, attained at least 25 aerial victories during the First World War; these photos from his personal collection are today part of the Air Force Museum of New Zealand’s archive



ABOVE RIGHT: An early morning in 1917 at Sainte-Marie-Cappel, France, and Caldwell (right) has a shave alongside fellow No 60 Squadron pilot Capt Robert Chidlaw-Roberts.



BELOW: SE5as of No 74 Squadron’s ‘B’ Flight at Clairmarais South, to which location near Saint-Omer the unit transferred on 7 August 1918 and stayed until 28 September.


At London Colney in Hertfordshire, No 74 Squadron's new SE5as form an impressive line in March 1918 prior to their deployment to France. The aircraft furthest to the right is serial C1792.

ABOVE: An RE8 about to crash near Le Hamel in the Somme region on 4 July 1918, the day of the Battle of Hamel, which saw notable support being provided by the RFC to ground forces. This aircraft may come from No 3 Squadron, AFC.

RIGHT: No 4 Squadron, Australian Flying Corps, and its Sopwith Camels shared Clairmarais North with Caldwell's No 74 Squadron between April and June 1918.

Capt Benjamin Roxburgh-Smith joined No 74 Squadron during early 1918 and ended the war with 22 aerial victories, all achieved in its SE5as.

A demob-happy spirit is evident as Caldwell (left rear) and others make their way home from Europe aboard the SS *Bremen* in 1919. The ocean liner had been presented to P&O as part of war reparations.

Have you got photos to contribute to Personal Album? If so, e-mail the editor at ben.dunnell@keypublishing.com

The
Great War Aviation Society

Contact!

World War I Aviation Magazine

download two FREE digital issues!

The Great War revolutionised aviation, laying the foundations for modern air combat as we know it today. From £25 a year, you can explore this pivotal era in aviation history.

The Great War Aviation Society
Contact!
THE WORLD WAR I AVIATION MAGAZINE
GERMANY
MENG FOKKER DR.I MODEL BUILD | GERMAN TRAINING SCHOOL MARKINGS | THE RED BARON ZEPPELIN BLITZ
greatwaraviation.org SPRING 2025_01

FREE digital issues at tinyurl.com/42pus3ac

"Whether you are a seasoned student of the subject, or a novice with a burgeoning interest in the 'Knights of the Sky', Contact! is an essential read."

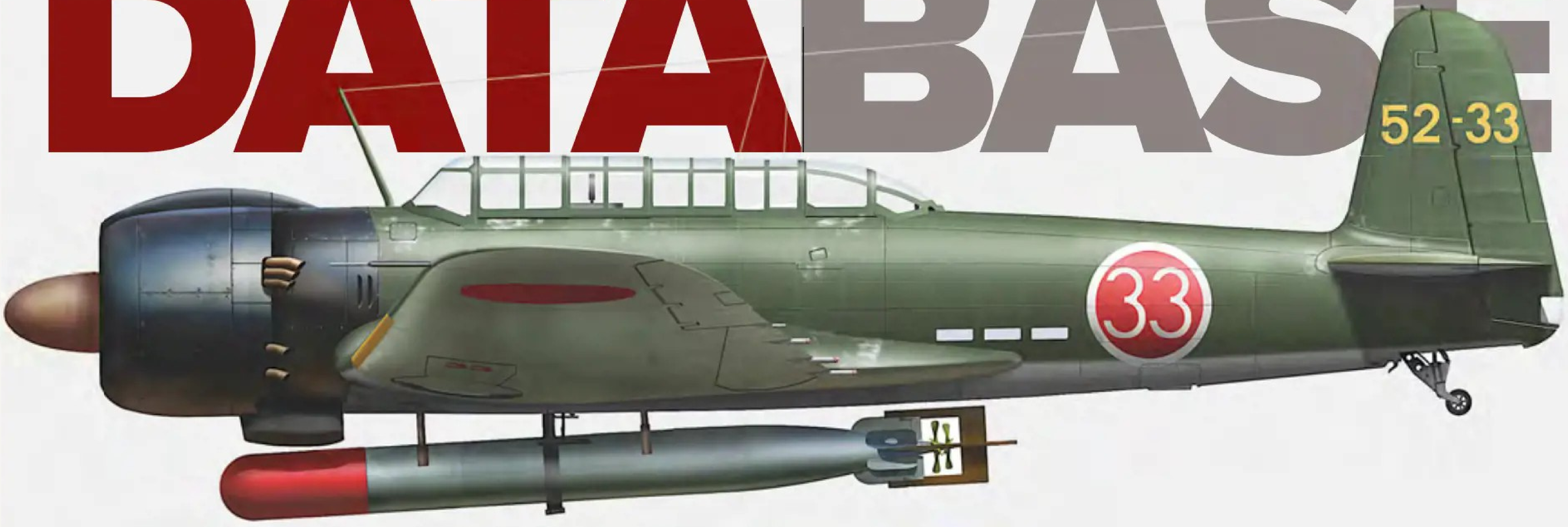
Classic Wings

Join today at **www.greatwaraviation.org/2025-membership** for as little as £25 (digital) or £27+P&P (print) and receive four issues of Contact! magazine.

Act now to receive the first edition of 2025 and help preserve the legacy of WWI aircraft and crews.

SEAFIS
E9968

AEROPLANE DATABASE



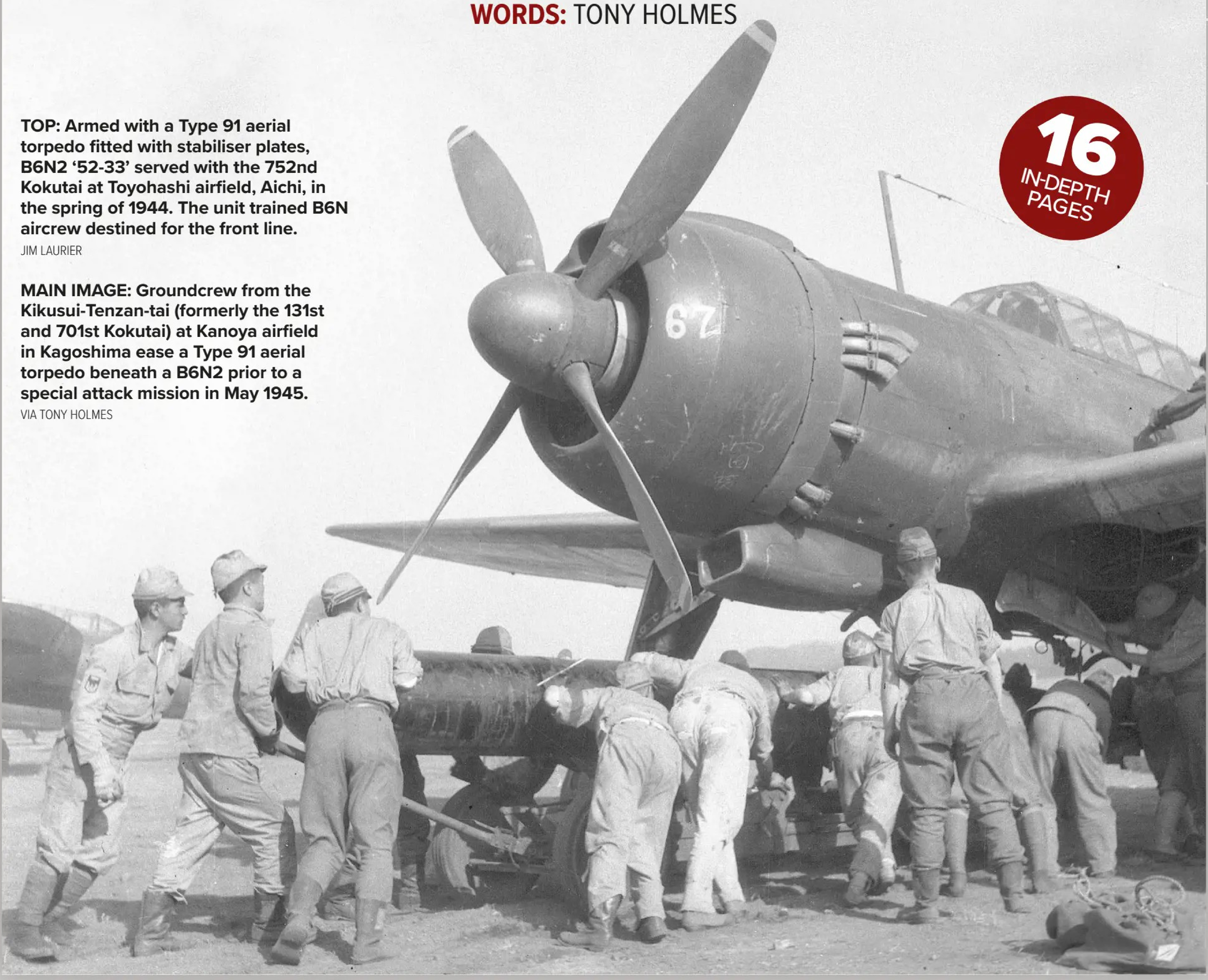
NAKAJIMA B6N TENZAN

WORDS: TONY HOLMES

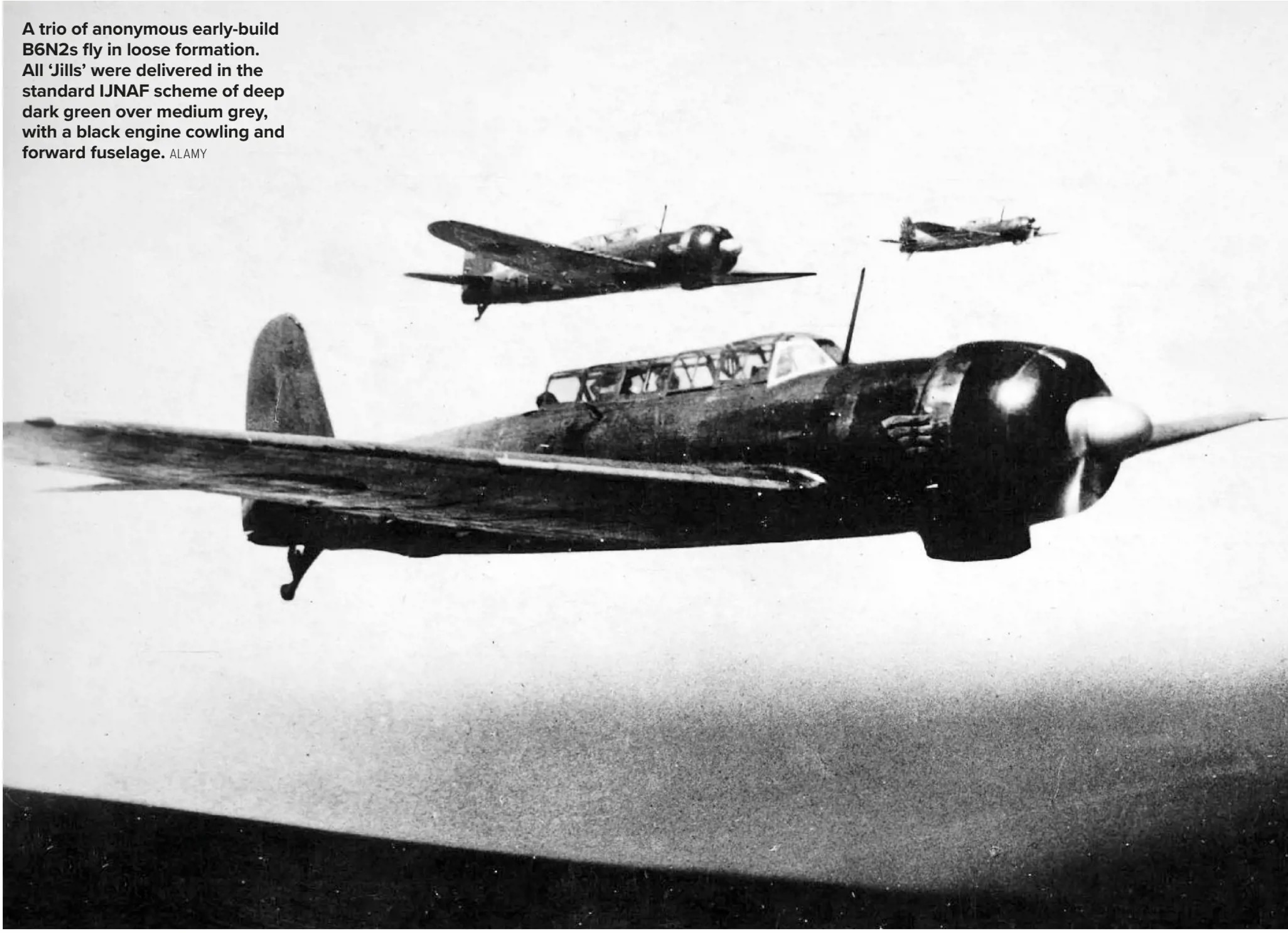
16 IN-DEPTH PAGES

TOP: Armed with a Type 91 aerial torpedo fitted with stabiliser plates, B6N2 '52-33' served with the 752nd Kokutai at Toyohashi airfield, Aichi, in the spring of 1944. The unit trained B6N aircrew destined for the front line.
JIM LAURIER

MAIN IMAGE: Groundcrew from the Kikusui-Tenzan-tai (formerly the 131st and 701st Kokutai) at Kanoya airfield in Kagoshima ease a Type 91 aerial torpedo beneath a B6N2 prior to a special attack mission in May 1945.
VIA TONY HOLMES



Pacific War experience informed the design of this new torpedo bomber



A trio of anonymous early-build B6N2s fly in loose formation. All 'Jills' were delivered in the standard IJNAF scheme of deep dark green over medium grey, with a black engine cowling and forward fuselage. ALAMY

In 1938, during the early stages of the Second Sino-Japanese War, the Imperial Japanese Naval Air Force (IJNAF) introduced into service a revolutionary new torpedo/attack aeroplane in the form of the Nakajima B5N1. Subsequently given the codename 'Kate' by the Allies, the aircraft excelled in the combat arena both as a level bomber and in the highly demanding torpedo bomber role. Indeed, it inflicted a heavy toll on the US Navy's Pacific Fleet during the infamous Japanese dawn raid against Pearl Harbor, Hawaii on 7 December 1941.

Although the B5N1/2 proved to be very effective during the early stages of the Pacific War, the IJNAF soon became aware that there were several shortcomings in its design, particularly the inadequate provision of armour protection for the crew, the lack of self-sealing fuel tanks and the aircraft's modest top speed. The Imperial Naval Staff duly authorised Nakajima to pursue the design and development of a more advanced replacement, issuing a request for a successor to the B5N as early as 1939 with the release of the 14-Shi specification.

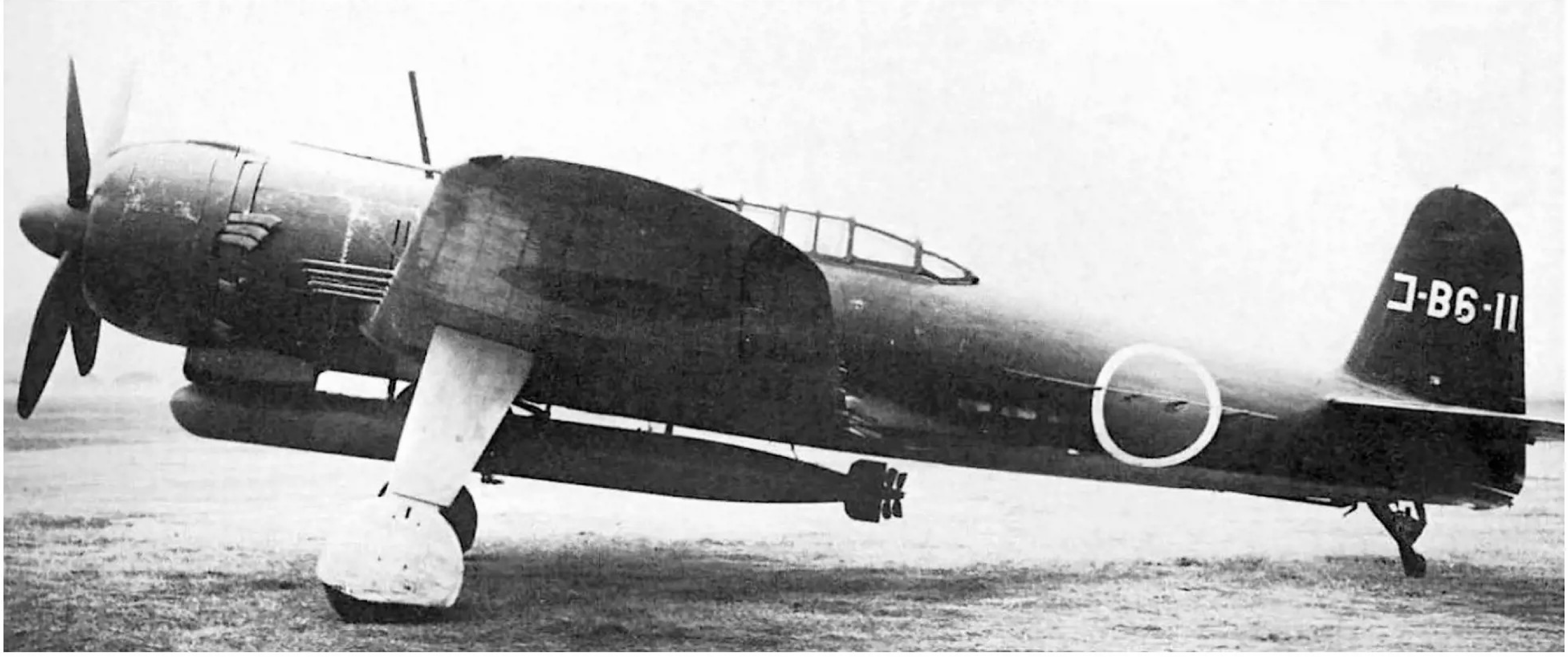
This called for a three-seat carrier-borne torpedo bomber with a top speed of 288mph and a range of 1,151 miles, able to carry a 1,763lb bomb load or to achieve a range of 2,072 miles without any ordnance.

> *The design was plagued by serious engineering flaws*

The new aeroplane, which was designed by Kenichi Matsumura and designated the B6N by the IJNAF, was aerodynamically similar to the B5N, but its Nakajima NK7A Mamoru 11 14-cylinder air-cooled radial engine produced 1,870hp, 80 per cent more than the Nakajima NK1B Sakae 11 in the B5N2.

Constrained by carrier stowage restrictions, Matsumura was forced to use a wing that was similar to the B5N's in both span and area, despite his new aircraft — called the Tenzan ('Heavenly Mountain') — being considerably heavier than the 'Kate'. This meant the B6N would suffer from a high landing speed and wing loading, restricting its fleet use to larger carriers only. Fowler flaps were added to the wing's trailing edges in an attempt to address these issues, these normally being lowered to an angle of 20° during take-off and 38° when landing. Like the B5N, the B6N was built with outer wing panels that could be hydraulically folded, reducing the wingspan from 48ft to just 21ft. Among the type's key external features were forward-swept vertical tail surfaces, which were adopted to keep its length within the 36ft 1in limit imposed by the IJNAF and ensure the B6N could be accommodated on carrier elevators.

The IJNAF also insisted the aeroplane should be powered



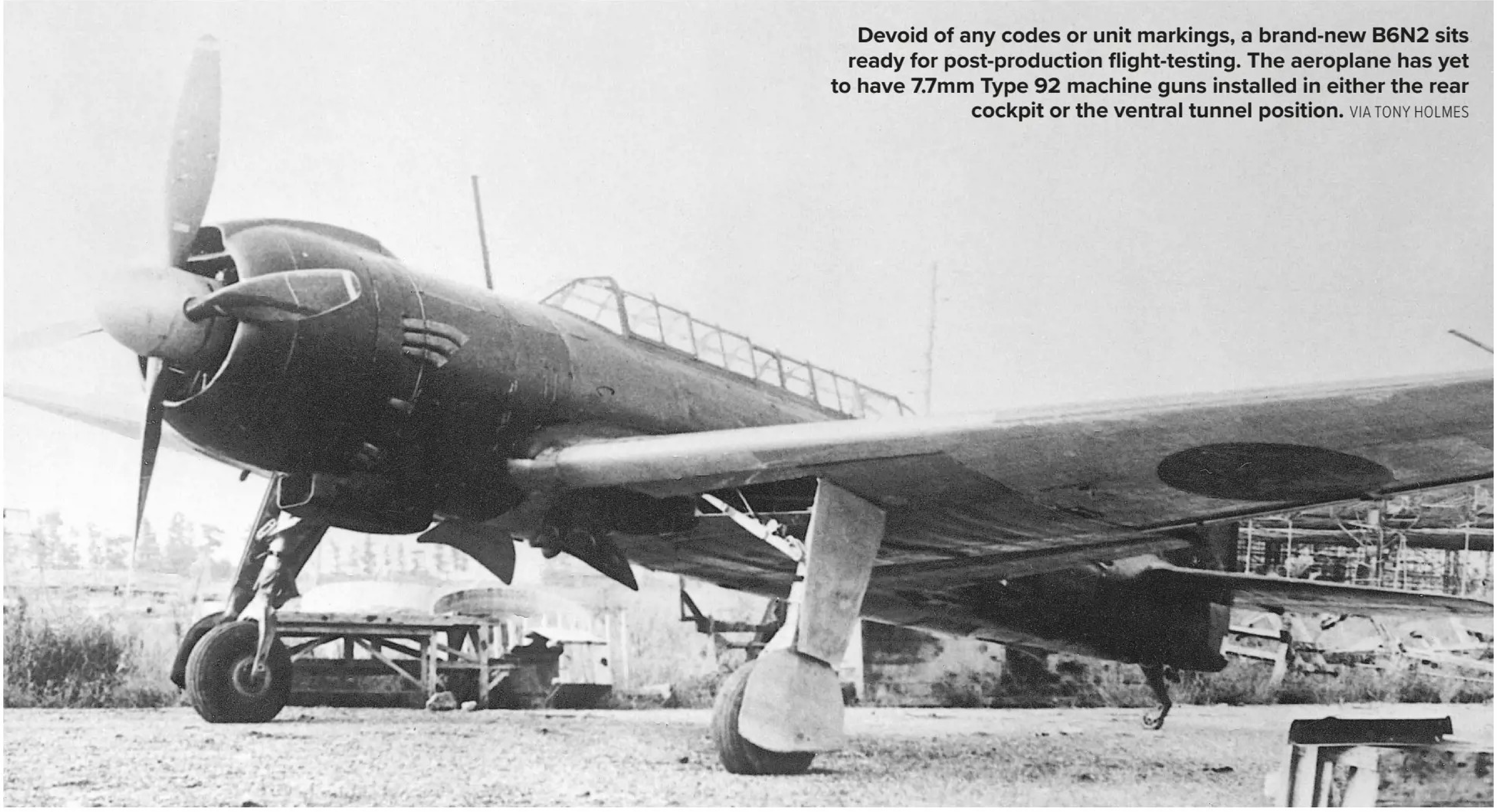
One of a handful of prototype B6N2s built, this aircraft is carrying a Mk91 torpedo and has been fitted with the 3-Shiki Type 3 air-to-surface vessel radar, hence the yagi antenna on the fuselage. The four slender tubes protruding from the leading edge of the wing may also be part of an experimental radar antenna fit. VIA TONY HOLMES

by the proven Mitsubishi MK4T Kasai 25 radial engine, rated at 1,850hp, but Matsumura stuck with the new Mamoru 11 because of its lower fuel consumption and potential for development. Fitted with the latter unit, the first two of prototypes made the aircraft's maiden flight on 14 March 1941.

When flight-testing commenced in earnest shortly thereafter, it was soon found that the design was plagued by serious engineering flaws. These included directional stability issues caused by the powerful torque of the four-bladed propeller. To solve this, Matsumura found he had to move the vertical tail surfaces 2° to the left. Teething problems experienced with the Mamoru 11 engine — severe vibration and overheating at various speeds — also badly delayed the test programme, which meant the B6N was not deemed ready to undertake carrier acceptance trials until late 1942.

Once these eventually took place aboard the *Ryuho* and *Zuikaku*, the aeroplane's arrester hook was found to be too weak and several landing mishaps occurred as a result. Aside from a necessity to strengthen the hook mounting, the trials revealed that rocket-assisted take-off gear (RATOG) was required when the B6N1 was being operated from the flight deck at its maximum gross weight of 12,456lb. RATOG was never destined to be used operationally, however.

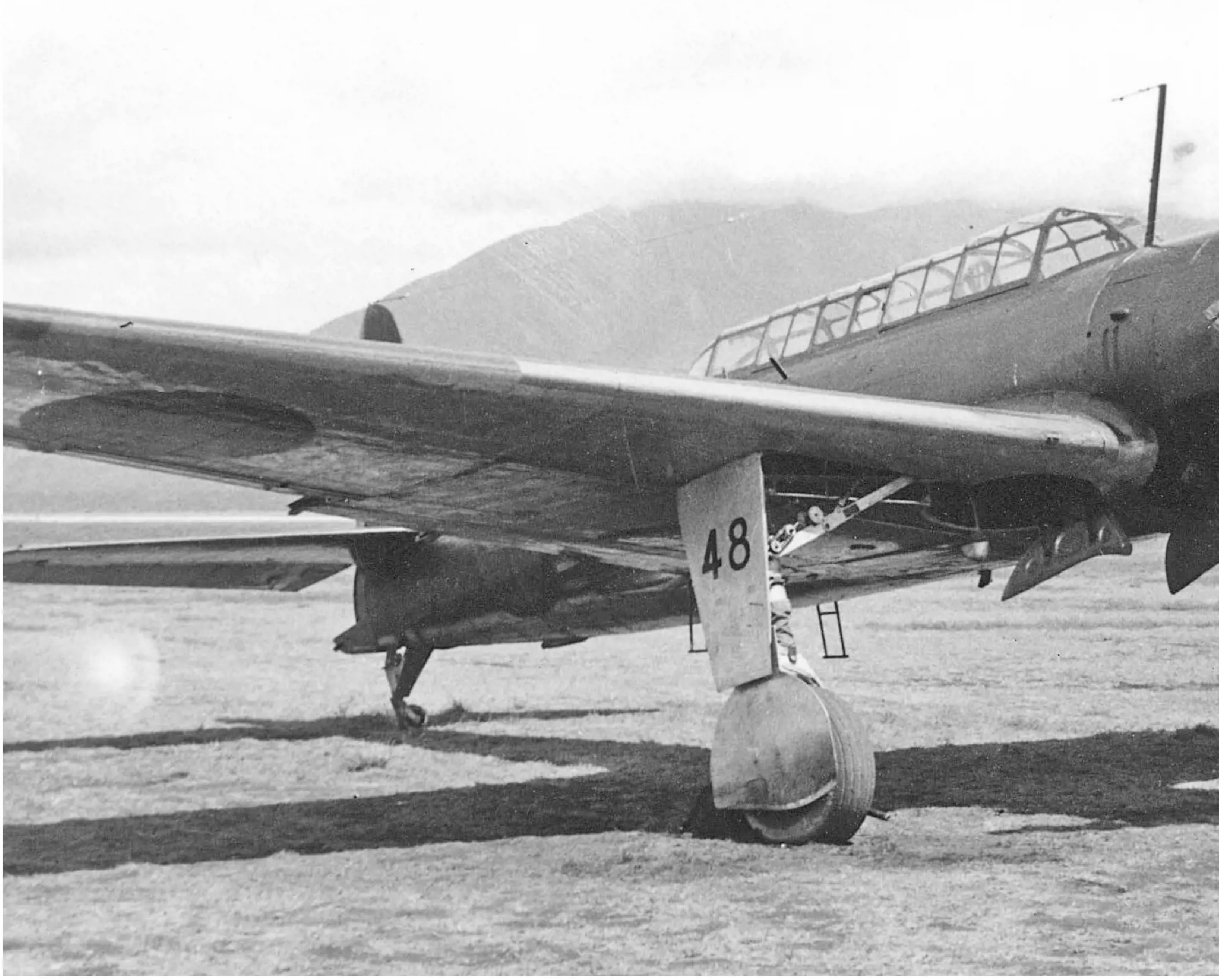
➤



Devoid of any codes or unit markings, a brand-new B6N2 sits ready for post-production flight-testing. The aeroplane has yet to have 7.7mm Type 92 machine guns installed in either the rear cockpit or the ventral tunnel position. VIA TONY HOLMES

Perfecting the design of the basic B6N

A newly delivered B6N2 at an unidentified airfield in Saipan circa 1944. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION

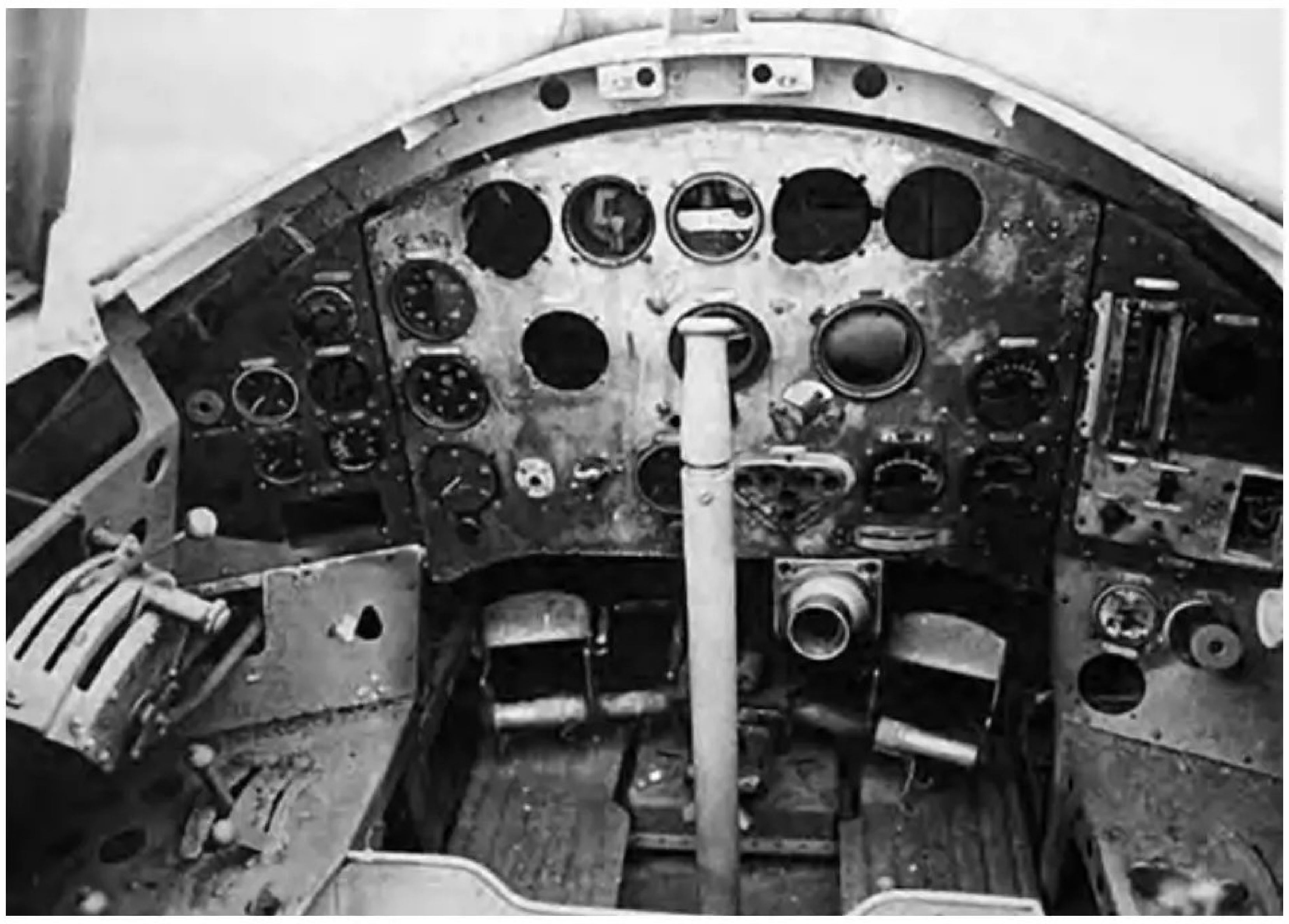


Following an extended period of testing and modification lasting more than two years, the Tenzan was finally accepted for service in February 1943. The production-standard B6N1 introduced a number of modifications to make it suitable for fleet use. These included smaller exhaust units in place of the single exhaust stack, which was found to create significant glare at night; angling-down of the torpedo rack on the starboard side of the fuselage by 2°, and fitment of the Type 91 aerial torpedo with stabilising tail plates to eliminate bouncing during low-altitude release; strengthening of the main undercarriage attachment and tailplane; and the addition of a single, flexible, dorsal 7.7mm Type 97 machine gun in the rear cockpit and a second flexible Type 97 firing through a ventral tunnel. To use the latter, the rear gunner had to unstrap himself from his seat, crouch and then lay in a ventral cradle, before lowering it so as to allow him to aim and fire the weapon.

Nakajima had also attempted to improve the new aircraft's combat survivability by replacing the unprotected semi-integral fuel tanks fitted in the B5N with protected bag-type tanks, but their installation cut overall fuel capacity by no less than 30 per cent. The IJNAF reluctantly decided to stick with the original semi-integral tanks.

> *“Nakajima attempted to improve the aircraft's combat survivability”*

After production of just 133 B6N1s (excluding two prototypes) from February-July 1943, Nakajima was instructed by the Ministry of Munitions to cease production of the Mamoru 11, allowing the company to concentrate on building the more widely used Sakae and Homare engines. Nakajima only had to make small modifications to the airframe to allow it to use the Mitsubishi engine, thus allowing production to continue without



ABOVE: The cockpit of a captured B6N2, probably the one that still survives.

BELOW: A B6N2 on the strength of the Kikusui-Tenzan-tai runs up to full power prior to taking off from Kanoya on a kamikaze attack in early May 1945. The pilot has cranked his seat up as high as it will go in an effort to improve his line of sight over the 'Jill's' nose while taxiing and taking off. VIA TONY HOLMES

significant delays. Fitted with the Mitsubishi MK4T Kasai 25 rated at 1,850hp, the re-engined Tenzan was designated the B6N2. Aside from a change of powerplant, the aircraft featured minor internal improvements and a non-retractable tailwheel — the latter was fully retractable on the B6N1.

The late-production B6N2a had its dorsal Type 97 weapon replaced with a 13mm Type 2 machine gun, although the 7.7mm weapon was retained in the ventral tunnel. A total of 1,133 B6N2s would be completed by Nakajima at its Koizumi and Handa plants between June 1943 and August 1945.

The 751st and 752nd B6N2s built by Nakajima served as prototypes for the B6N3, each aircraft being powered by a Mitsubishi MK4T-C Kasai 25c rated at 1,850hp. This model was to feature a strengthened undercarriage that boasted larger wheels for operations from semi-prepared runways at land bases, as the Imperial Japanese Navy (IJN) had by then been shorn of most of its carriers. However, B6N3 production had not yet commenced when the war ended.

DATAFILE SPECIFICATIONS: NAKAJIMA B6N2

POWERPLANT

One Mitsubishi MK4T Kasai 25 radial piston engine, 1,850hp

DIMENSIONS

Span:	48ft 10in (14.8m)
Length:	35ft 7in (10.8m)
Height:	12ft 5in (3.8m)

PERFORMANCE

Maximum speed:	299mph (481km/h)
Cruising speed:	207mph (333km/h)
Ceiling:	29,660ft (9,040m)
Range:	1,085 miles (1,746km) normal and 1,892 miles (3,045km) maximum

WEIGHTS

Empty:	6,636lb (3,010kg)
Loaded:	11,464lb (5,200kg)

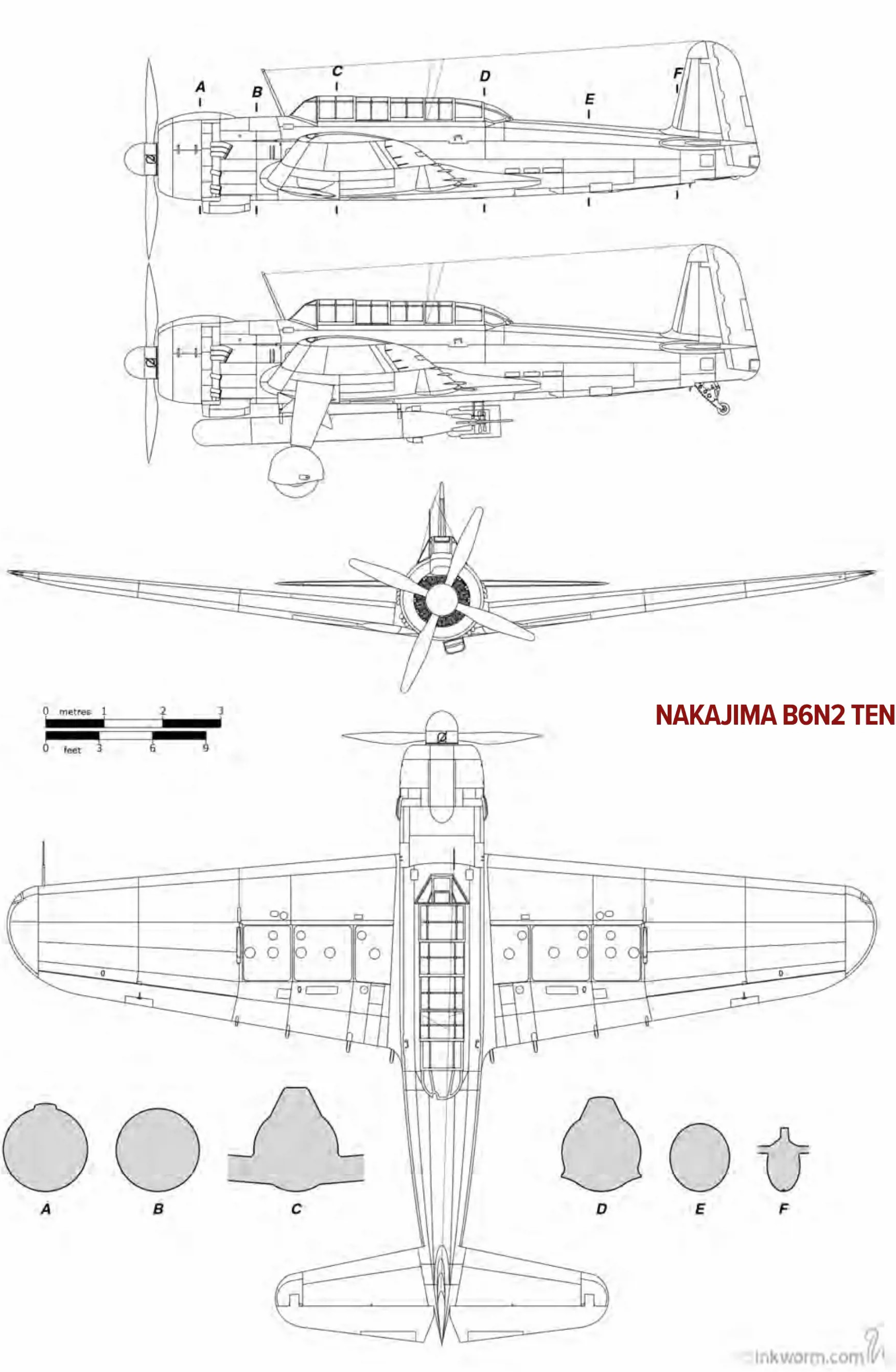
CREW

Pilot, observer/navigator/bomb-aimer and radio operator/gunner

ARMAMENT

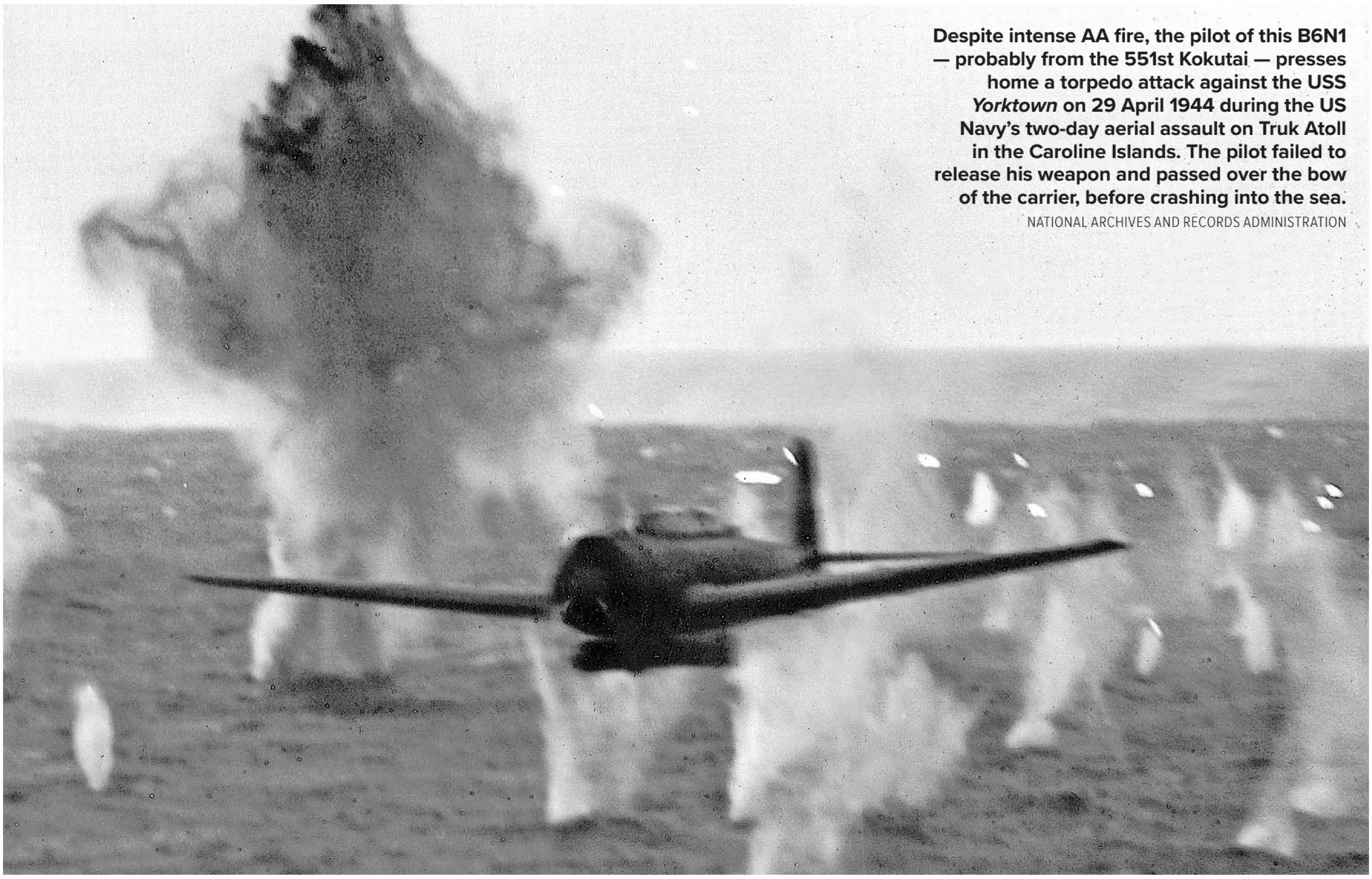
One dorsally mounted, flexible, rear-firing 7.7mm (0.3in) Type 97 machine gun and one flexible 7.7mm (0.3in) Type 97 machine gun firing through a ventral tunnel; up to 1,764lb (800kg) of bombs or one Type 91 aerial torpedo

NAKAJIMA B6N2 TENZAN


A
B
C
D
E
F
0 metres 1 2 3
0 feet 3 6 9
A
B
C
D
E
F
inkworm.com

IN SERVICE

The 'Jill' was not an ineffective aeroplane, but it couldn't change the tide of the Pacific campaign

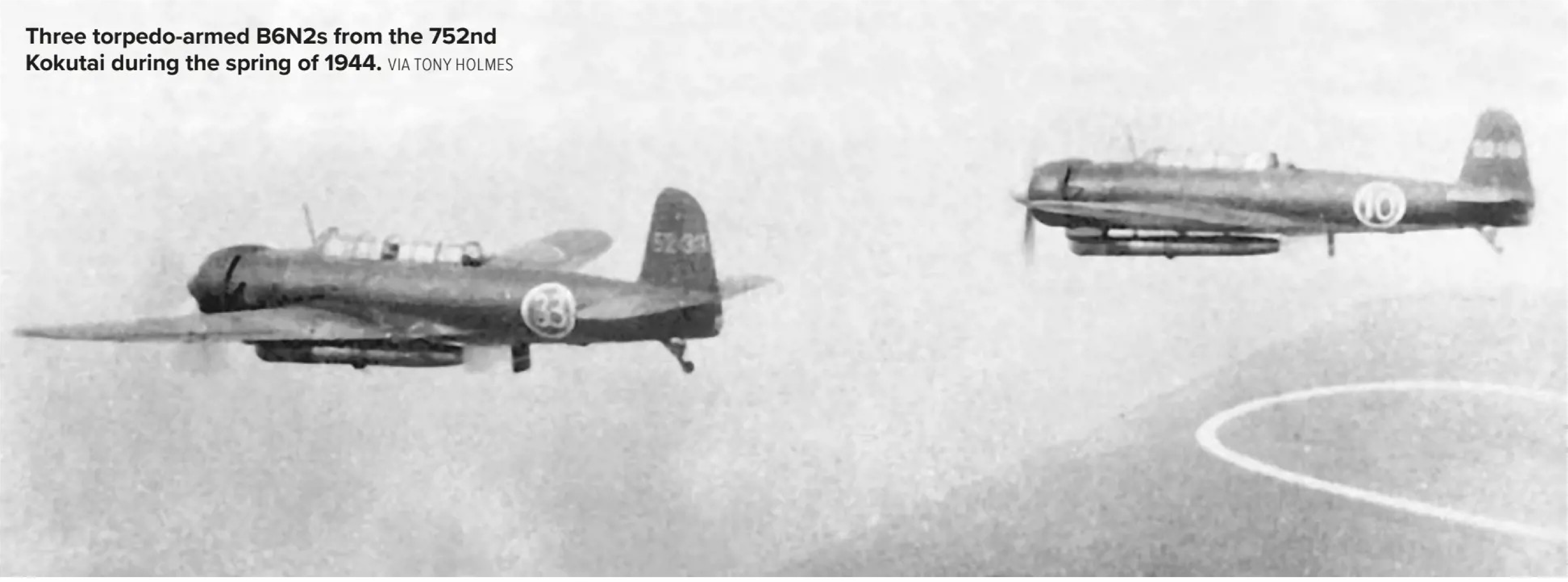


Despite intense AA fire, the pilot of this B6N1 — probably from the 551st Kokutai — presses home a torpedo attack against the USS *Yorktown* on 29 April 1944 during the US Navy's two-day aerial assault on Truk Atoll in the Caroline Islands. The pilot failed to release his weapon and passed over the bow of the carrier, before crashing into the sea. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION

The IJNAF had planned for its carrier air groups to gradually transition from the B5N to the B6N — christened 'Jill' by the Allies, who gave all Japanese bombers female names and all Japanese fighters male ones — from the autumn of 1943. However, the first front-line unit issued with the aircraft was the land-based 531st Kokutai (Air Group), activated on 1 July 1943 at Tateyama. It is not clear precisely when the initial examples were received, although it is highly likely B6N1s began to arrive during August. A detachment was sent to the northern Kurils in September 1943, where it was engaged in patrols but saw no combat.

Twelve B6Ns from the 531st Kokutai were also deployed to Kavieng, on New Ireland in New Guinea, in mid-November to reinforce IJNAF units in the Rabaul area after the formal end of Operation 'Ro-go', the disastrous attack on US naval forces in the Solomon Islands in an attempt to halt Allied air strikes on Rabaul. They were absorbed into the 582nd Kokutai. It was with the latter unit that the 'Jill' first saw combat when six examples took part in attacks on US Navy vessels off Bougainville on 3 December 1943. Aside from its dwindling force of D3A 'Val' dive-bombers, the 582nd Kokutai operated a mixture of B5N2 'Kates' and B6N1 'Jills' at this time. The few of the latter type on hand, however, were soon lost on operations over the following weeks.

Meanwhile, the main body of the 531st Kokutai deployed to the Marshall Islands, in the central Pacific, from Japan. It was based primarily at Kwajalein, with flights also operating from Wotje and Mili. The unit's 'Jills' did fly

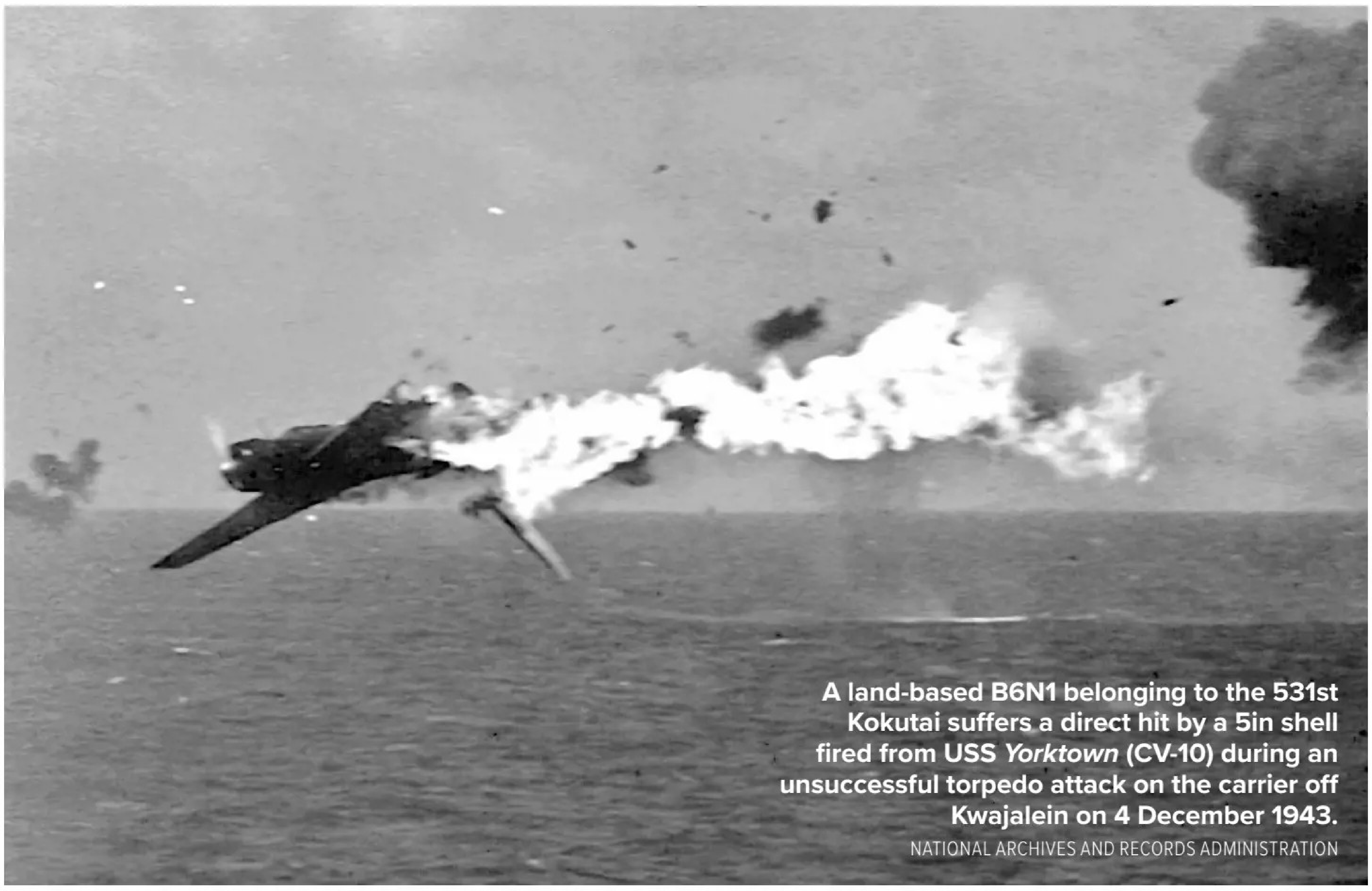


Three torpedo-armed B6N2s from the 752nd Kokutai during the spring of 1944. VIA TONY HOLMES some combat sorties against US warships off the Gilbert Islands on 4 December 1943 following enemy landings at Makin and Tarawa the previous month, but the entire Kokutai was annihilated when US forces landed on Kwajalein between 31 January and 3 February 1944. The 531st Kokutai was officially stricken from the IJNAF's order of battle on 20 February 1944.

Five months earlier, the 551st Kokutai had become the second unit to receive B6N1s when it was formed from the attack aeroplane component of the 331st Kokutai in Singapore on 1 September 1943. Like the 531st, the 551st Kokutai operated a mixed force of 'Kates' and 'Jills', conducting operations in the Netherlands East Indies and over the Bay of Bengal.

The B6N component, totalling 26 aircraft, was subsequently transferred to Truk, in the Caroline Islands, on board the escort carrier *Kaiyo*. The vessel arrived there on 11 February 1944, and the aircraft were sent to the airfield at Param Island. Six days later, the 551st Kokutai suffered crippling losses during the US Navy carrier raid (codenamed Operation 'Hailstone') on Truk, with no fewer than 18 B6N1s being destroyed on the ground. A handful of torpedo bombers did mount some counter-attacks against the carrier task force, but they were quickly despatched — the American pilots involved misidentified their targets as 'Kates'. The 551st Kokutai was eventually reconstituted and took part in the First Battle of the Philippine Sea from land bases, but it was decimated in this action and deactivated on 10 July 1944.

Finally, the 553rd Kokutai, which had originally been formed on 20 February 1944, also operated both 'Kates' and 'Jills' in the Kuril Islands from late April 1944 until it was transferred to the Philippines at the beginning of October, leaving a small rear echelon of four B5Ns and a solitary B6N that was folded into the Hokuto (North-east) Kokutai and continued operating in the Kurils. The sole 'Jill' was subsequently lost to operational causes.



A land-based B6N1 belonging to the 531st Kokutai suffers a direct hit by a 5in shell fired from USS *Yorktown* (CV-10) during an unsuccessful torpedo attack on the carrier off Kwajalein on 4 December 1943.
NATIONAL ARCHIVES AND RECORDS ADMINISTRATION

Carrier operations

With the IJNAF's fighting strength significantly reduced following the attacks on Rabaul and Truk, the Japanese high command realised it had to try and protect its remaining naval aircraft in an attempt to stall the Allied advance. Following months of operating from shore bases, the IJNAF's air groups would finally re-embark aboard the First Mobile Fleet's carriers in the late spring of 1944 when the IJN chose to take a stand in the First Battle of the Philippine Sea. This clash, fought off the Mariana Islands in the central Pacific on 19-20 June, would ultimately result in yet another defeat for the Japanese and signal the end of the IJNAF as an effective fighting force.

Immediately prior to the First Battle of the Philippine Sea, American carrier aircraft launched strikes on IJNAF airfields in the Marianas and on Iwo Jima and Chichi Jima for six days from 11 June. Trying to strike back, a handful of land-based 'Kates' and 'Jills' — as many as 40 B6Ns had been flown to airfields in the Marianas from Peleliu along with other IJNAF reinforcements — attempted dusk or dawn torpedo attacks

This 531st Kokutai B6N1 was shot down after making an unsuccessful torpedo attack on the USS *Yorktown* on 4 December 1943 during the Marshall Islands campaign.
VIA TONY HOLMES

on the American carriers on the 15th, 17th and 18th without success. Three B5N2s and six B6N2s fell to FM-2 Wildcats of VC-4 and VC-68 flying combat air patrols from escort carriers.

It appears the only success enjoyed by land-based torpedo bombers (of the 551st Kokutai) was the destruction of the 400-ton troop-carrying Landing Craft Infantry amphibious assault ship LCI(G)-468 during a dusk attack by five B6N2s on 17 June — three of the 'Jills' were downed by anti-aircraft (AA) fire from the remaining landing craft east of Saipan.

Exactly how many B6Ns subsequently participated in the actual carrier battle on 19-20 June is open to speculation, as they were flying with a number of air groups by then. According to IJNAF records, in May 1944 the 601st Kokutai assigned to the First Koku Sentai (Carrier Division) embarked in *Shokaku*, *Zuikaku* and *Taiho* had 227 aeroplanes on strength including 56 B6N2s, the 652nd Kokutai of the Second Koku Sentai (embarked in *Hiyo*, *Junyo* and *Ryuho*) had 135 aircraft assigned, of which 18 were B6N2s, and the 653rd Kokutai of the Third Koku Sentai (embarked in *Chitose*, *Chiyoda* and *Zuiho*) had 90 aeroplanes including a mixed force of 27 B5N2s and B6N2s.

The First Kido Butai (Mobile Force) sailed from its Tawi-Tawi anchorage, on the north-east coast of Borneo, on 13 June to engage the Pacific Fleet off the Marianas. Before dawn on the 19th, Vice Admiral Jisaburo Ozawa, commanding the First Kido Butai, launched search aircraft that spotted US Navy carriers 322 miles (518km) from the Third Koku Sentai.

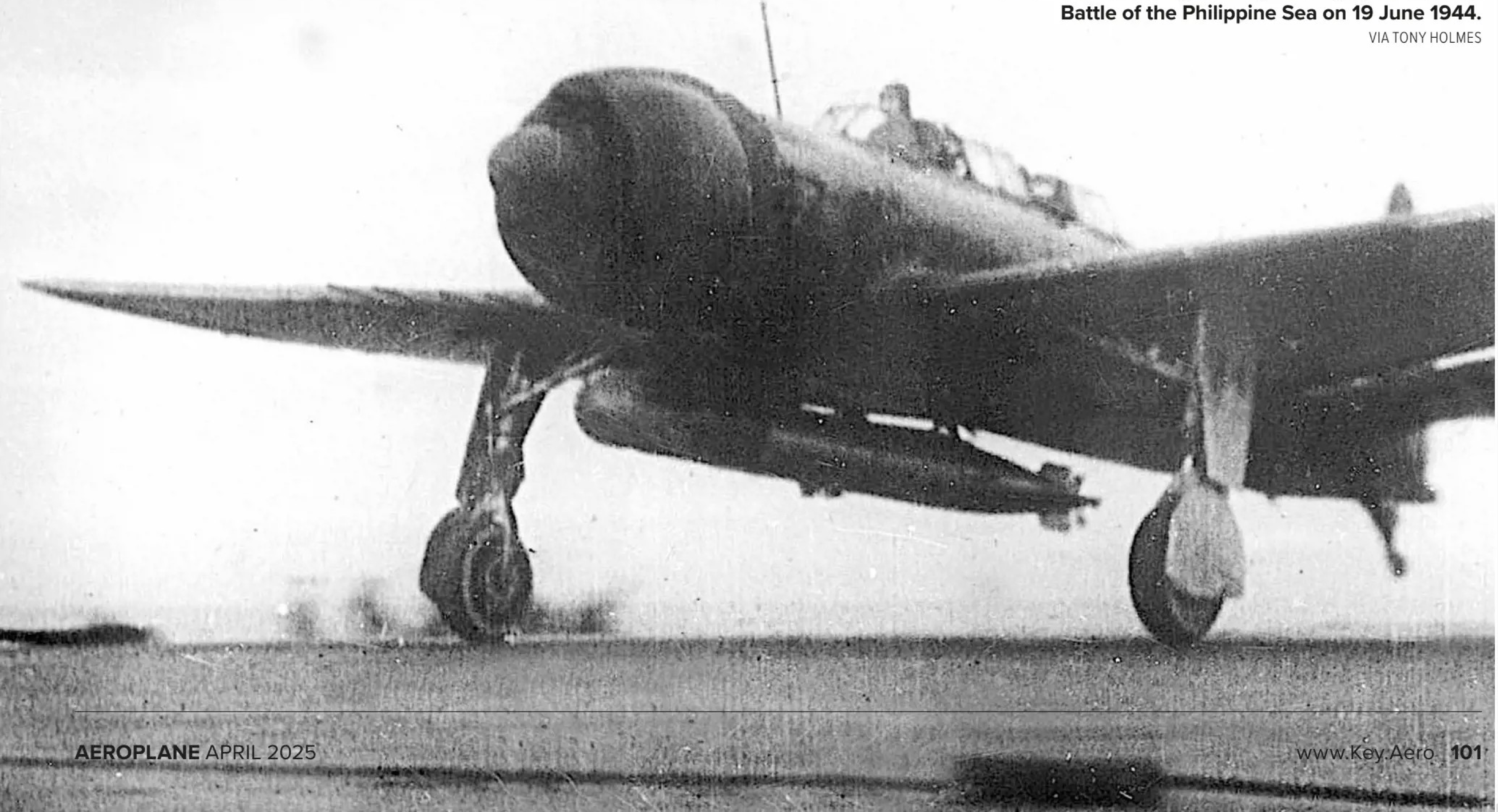
> ***"The inexperienced crews suffered horrendous losses to the US Navy"***

At 08.30hrs, the IJN carriers began to launch a first strike force composed of three waves. *Taiho*, *Shokaku* and *Zuikaku* despatched 48 A6M Zero-sen fighters, 53 D4Y 'Judy' dive-bombers and 27 'Jill' torpedo bombers between them, *Junyo*, *Hiyo* and *Ryuho* launched 16 Zero-sen, seven 'Judys' and 26 'Jills' and *Chitose*, *Chiyoda* and *Zuiho* contributed 14 Zero-sen, 28 'Judys' and 26 'Jills' to this initial strike.

Despite this being the largest number of carrier-based aircraft ever sent against the Pacific Fleet in a carrier-versus-carrier action, the effectiveness of US Navy shipboard radar meant the IJNAF aeroplanes were engaged by F4F Wildcats and F6F Hellcats manning CAP stations well before they reached their target. Furthermore, the inexperience of the crews manning the IJNAF aircraft meant they would suffer horrendous losses at the hands of the US Navy fighter pilots. Of the 200-plus aeroplanes despatched in the first strike, fewer than 50 made it through the fighter screen. Those that did manage to attack the American warships were targeted by intense AA fire, resulting in the aircraft managing just single hits on the fast battleships USS *South Dakota* (BB-57) and USS *Indiana* (BB-58).

Additional strikes were sent out during the course of the morning, the Second Koku Sentai launching 20 Zero-sen, 36 'Judys' and 26 'Jills' at 10.00hrs. Around 20 aircraft from this second wave made it through the fighter CAP, and when two B6N2s attempted to target *South Dakota*, the torpedo bombers were driven off by accurate AA fire from the battleship USS *Alabama* (BB-60). Another 'Jill' managed to launch a torpedo at *Indiana*, which defeated the weapon with evasive manoeuvres — the Type 91 exploded harmlessly in the battleship's wake.

By then *Taiho* had suffered a mortal torpedo hit after being targeted by USS *Cavalla* (SS-244), the latter subsequently striking *Shokaku* twice at 11.22hrs. *Shokaku* sunk some two-and-half hours later, taking 1,272 sailors and nine aircraft, including two 'Jills', with it, while *Taiho* was wracked by a series of explosions caused by igniting avgas vapour shortly thereafter. This reduced the strength of the First Koku Sentai to a single carrier, *Zuikaku*, which launched just eight aircraft in a follow-up strike at 10.20hrs. This ship also recovered the few surviving aircraft from the first strike launched by *Taiho* and *Shokaku*. No aeroplanes from the follow-up strikes — including 47 aircraft, seven of ➲



A B6N2 equipped with the 3-Shiki Type 3 ASV radar and armed with a Type 91 aerial torpedo takes off from an IJN carrier during training leading up to the First Battle of the Philippine Sea on 19 June 1944. VIA TONY HOLMES them B6N2s, from the Second Koku Sentai — reached the US fleet, the fighter CAP and the ships' deadly AA screen exacting a heavy toll.

With the First Mobile Fleet still out of range of US carrier aircraft, but now shorn of two carriers and 244 aeroplanes of the 374 launched in four strikes, the IJN ordered its withdrawal to Nakagusuku Bay off Okinawa. The ships' departure westward was delayed, however, by the need to slow down in order to refuel at sea during the morning of 20 June. This provided the Pacific Fleet's Task Force (TF) 58 with the opportunity to catch up with the retreating Japanese warships and launch a solitary strike, which targeted the surviving carriers at dusk.

The incoming aircraft were detected approaching from the east at 17.40hrs, at which point *Hiyo* swung out to launch two B6N2s that were tasked with laying a smokescreen to hide the fleet. This manoeuvre caused the carrier to fall almost four miles behind *Junyo* and other ships within the First Mobile Fleet, leaving it vulnerable to attack. At 17.45hrs enemy dive and torpedo bombers appeared overhead and made a co-ordinated attack, *Hiyo* being struck by a single bomb and a torpedo. It eventually sank at 19.32hrs. The carriers *Chiyoda*, *Junyo* and *Zuikaku* were hit as well, the latter two suffering significant damage.

The First Battle of the Philippine Sea had been a total disaster for the IJN, which had lost three carriers, whilst the IJNAF had 433 carrier-based and more than 200 land-based aeroplanes destroyed. US Navy fighter pilots had claimed 422 aerial victories during the battle — dubbed the 'Great Marianas Turkey Shoot' by the naval aviators involved — of which 44 were identified as 'Jills' or 'Kates'. Having spent a year rebuilding its carrier air groups, the IJNAF had lost 90 per cent of its aircraft in just two days.

Now the threat of the First Mobile Fleet had been neutralised, TF 58 continued on its offensive in the central Pacific. Among the first targets it attacked following the Marianas clash was Iwo Jima on 24 June. A further 116 IJNAF aircraft were claimed as destroyed on this date, including no fewer than 29 'Kates' — almost certainly 'Jills' — sent out in two waves to attack the US carriers. Both strikes were clinically dealt with by the Hellcat CAP, predominantly from VF-2 embarked in USS *Hornet* (CV-12). The first wave was attacked 70 miles (112km) from TF 58 at 10.00hrs and the second engaged at 17.35hrs. Although the torpedo bombers in the second wave also had a Zero-sen fighter escort, none of them got within sight of the American carriers.

Second Battle of the Philippine Sea

The IJN's final carrier action occurred in October 1944 during the Second Battle of the Philippine Sea, also known as the Battle of Leyte Gulf. Given how the IJNAF had struggled to make good the grievous losses it had suffered off the Marianas four months earlier, this clash was almost a non-battle. In theory, the four carriers of the First Mobile Force could embark a total of 230 aircraft, but a lack of aeroplanes — most of the assigned air groups had been sent to Formosa earlier in October to support land-based units — and suitably qualified pilots meant *Zuikaku*, *Zuiho*, *Chitose* and *Chiyoda* sailed with only 116 aircraft embarked, including 25 B6N2s and four B5N2s.

Unlike in previous carrier clashes, where the IJN's once formidable 'flat-tops' had been Japan's premier maritime weapon, Vice Admiral Jisaburo Ozawa's First Mobile Force was to act primarily as a decoy for US carrier aircraft of the Third and Seventh Fleets while nine battleships, 20 cruisers and more than 35 destroyers targeted the American invasion fleet in Leyte Gulf — troops had come ashore on 17 October.

This action was part of the overall 'Sho 1' ('Victory 1') plan devised by the IJN to oppose the impending American landings in the Philippines. As with the elaborate plan that went so spectacularly wrong during the ill-fated defence of the Marianas, 'Sho 1' was defeated by pre-emptive strikes undertaken by US carrier aircraft on airfields on Formosa, which were home to Japan's primary source of air support for the defence of the Philippines.

The torpedo of this radar-equipped 'Jill' of the Kikusui-Tenzan-tai is in the final stages of being shackled to the aircraft at Kanoya in May 1945. Watching closely is the crew of the aeroplane, wearing fur-lined flying helmets. VIA TONY HOLMES

Although more than 400 aircraft from both the Imperial Japanese Army Air Force (IJAAF) and the IJNAF were claimed as shot down during 10 days of carrier strikes from 10 October, the relatively few B6N2s on Formosa struck back with dawn and dusk torpedo attacks that crippled the heavy cruiser USS *Canberra* (CA-70) on the 12th and its replacement in Task Group (TG) 38.2, USS *Houston* (CL-81), the following day. *Canberra* had been hit below its armour belt, exposing the vessel's engineering spaces to the water and stalling the ship's steam turbines. *Houston* also received serious damage to its powerplants when a torpedo struck one of the warship's engine rooms. Four 'Jills' had targeted the light cruiser, and three of them had been downed by *Houston*'s gunners.

The *Atlanta*-class light cruiser USS *Reno* (CL-96) was actually hit in the fantail by a crashing B6N2 during one of the dusk attacks on TG 38.2 off Formosa, although it suffered only minor damage that included the number six twin 5in gun turret being partially incapacitated.

Canberra and *Houston* were taken under tow towards the Pacific Fleet anchorage at Ulithi, and during the late afternoon of 16 October they were attacked once again by B6N2s from Formosa. Although no fewer than 20 'Jills' and a solitary 'Kate' were credited to F6F pilots from VF-22 and VF-29 that were defending *Canberra* and *Houston*, the latter ship was struck in the stern by another torpedo following an attack from the rear. Nevertheless, *Houston* was kept afloat and eventually repaired.

These attacks were made possible following the introduction of new tactics by 'Kate' and 'Jill' crews during 1944, as noted in an Office of Naval Intelligence report detailing operations against Formosa, the Ryukyus and the Philippines in October-November 1944: "The late, twilight aircraft torpedo attacks on 13 and 14 October showed that the enemy had studied our defense and learned that we were vulnerable during twilight to low-flying torpedo attacks. By snooping through the later afternoon, he closely fixed our positions. Such snooping usually cost him most or all of the snoopers involved, but the results were worth it. The torpedo attack unit was then sent out to attack low on the water from the east, so as to silhouette the force against the last bit of remaining light."

On the day attacks on Formosa finally came to an end, 20 October, Ozawa's First Mobile

‘Jill’ pilots and navigators from an unidentified unit study a map of Luzon during a pre-mission briefing in early January 1945. Taking off just before dusk, they would time their attacks from the east to benefit most from the low light conditions. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION

> *“New tactics were introduced by ‘Kate’ and ‘Jill’ crews during 1944”*

Force departed Japan for the Philippines as part of ‘Sho 1’. The bulk of the IJN’s battleships and cruisers left Brunei two days later. Heading for the east coast of Luzon, Ozawa despatched B6N2 reconnaissance flights on 21-22 October in search of the US Navy carriers, losing three aeroplanes on both days due to the insufficient training of their crews — no enemy aircraft were encountered, and they simply ran out of fuel after becoming lost. Indeed, no American ships were sighted until the 24th.

That morning, at 11.45hrs, *Zuiho*, *Chitose* and *Chiyoda* of the First Mobile Force launched 53 aircraft — including just four B6N2s — on what proved to be virtually a suicide mission. Heading south, the IJNAF aeroplanes were quickly intercepted by Hellcats and the majority were shot down. The few survivors flew back to Clark Field, near Manila, as instructed by Ozawa prior to their departure.

Zuikaku launched 29 aircraft, six B6N2s among them, at 11.55hrs in the last offensive strike generated by a Japanese carrier. Aided by intermittent cloud cover, only 14 of these aeroplanes were lost to enemy action. After conducting a desultory attack on US Navy warships, the survivors landed back at Clark Field — 34 aircraft from the First Mobile Force were now there. US Navy fighter units had claimed 270 victories, including land-based aeroplanes from both the IJNAF and IJAAF, on 24 October, of which 14 were ‘Jills’ or ‘Kates’.

Ozawa transferred most of his remaining aircraft to bases in the Philippines the following day, although not before he had despatched four B6N2s at 05.55hrs in search of the American fleet. Lacking any fighter CAP, all four First Mobile Force carriers had been sunk by US Navy dive and torpedo bombers by mid-afternoon.

Kamikazes

The ineffectiveness of conventional air attacks on US Navy surface ships, particularly heavily defended targets like carrier task groups, forced the Japanese to re-evaluate their tactics during the autumn of 1944. The solution they arrived at was simple: crash their aircraft into Allied ships. This notion of self-sacrifice fitted well within the Japanese warrior psyche, and proved terrifying to the Allied sailors subjected to it. These tactics brought immediate results, and proved effective until the end of the war. The US Navy in particular was forced to adapt its tactics and operations and deploy new weapons to counter the threat.

While American defences destroyed most kamikazes before they had a chance to strike a vessel, the cost was very high. They struck more than 400 warships and craft, of which 60 were sunk. Personnel casualties were also horrendous with 6,805 killed and 9,923 wounded. For the Japanese, the cost was also high. In the end the kamikazes caused massive carnage yet were unsuccessful.

Although a policy of deliberately crashing aircraft into the target was not adopted until late 1944, there were documented instances before then of Japanese pilots deliberately targeting US Navy ships with their aircraft from as early as 1942. These suicide attacks were very much the exception to the rule during the early stages of the conflict in the Pacific, however.

At the start of the war, the IJNAF’s pilots were the best-trained naval aviators in the world. The carrier pilots were the cream of the crop, and showed themselves to be formidable adversaries. From Pearl Harbor to the Indian Ocean and then in the carrier battles of Coral Sea and Midway, they were renowned for their prowess. Clinical in their employment of the bomb and the torpedo, naval aviators had no need to resort to kamikaze tactics. And although Midway was a disaster from the standpoint that four of the IJN’s fleet carriers were sunk, aircrew losses were not yet crippling.

This changed during the fighting for Guadalcanal, which was a grinding six-month battle of attrition. There were two carrier clashes during the campaign, and the second one in October 1942 — the Battle of Santa Cruz — was a Pyrrhic victory, with Japanese aircrew losses being higher than at Midway. Just as alarmingly, some 1,100 naval aircraft had been destroyed during the entire campaign, along with most of their highly trained crews. This was followed by a prolonged attempt during much of 1943 to slow the American advance up the Solomon Islands, this fighting featuring a constant series of aerial battles. The net effect was to gut the IJNAF’s cadre of highly trained aircrew.

The effect of this was dramatically demonstrated in June 1944 in the largest carrier action of the war. As previously noted, prior to engaging TF 58 in the First Battle of the Philippine Sea, the IJN had assembled a large force of nine carriers with 430 aircraft embarked. This carefully husbanded fleet was committed to action after US troops came ashore in the Mariana Islands. Retention of the latter was considered critical, since they were within Japan’s inner defence zone. If these islands fell, the Americans would be in a position to mount long-range air attacks from airfields against the Japanese home islands.

The carrier battle did indeed turn out to be decisive, but not in the way the Japanese had hoped. Of the nine IJN carriers brought into the battle, three were sunk, and of the 430 aircraft available before the start of the campaign, only 35 remained at the end. Most disturbingly for the IJN, the greatest massing of carrier air power in World War Two saw just three US Navy ships slightly damaged and none sunk. In this battle, 60 IJNAF aircraft made bombing attacks and scored only five hits or damaging near-misses. None inflicted significant damage. The First Battle of the Philippine Sea resulted in the virtual annihilation of the IJN’s carrier force for the remainder of the war since there was no hope of training qualified aircrew capable of taking on the US Navy’s Fast Carrier Task Force.

To put it simply, conventional Japanese air attacks were increasingly ineffective. By one detailed accounting, in the first six months of 1944, 315 Japanese aircraft including B6Ns survived fighter interception to attack various US Navy ships. Of these, just 10 per cent scored a hit, and these most often caused only superficial damage. Of these 315 aircraft, 106 were shot down by AA fire. Against the US Navy's Fast Carrier Task Force, from November 1943 to June 1944, the results were under five per cent of aircraft hitting a target in daylight attacks and just over two per cent for night attacks. In daylight, 195 aircraft made attacks and 40 per cent were destroyed by AA fire.

With this backdrop, the examination of possible suicide tactics began to get traction. Even before the debacle during the First Battle of the Philippine Sea, there had been discussions in 1943 among the IJN's leadership about adopting suicide tactics. By August 1944 it was widely accepted that only suicide operations could change the course of the war. The man who translated these thoughts into action was Vice Admiral Takijiro Onishi.

On the surface, the kamikaze was a formidable weapon, and the formal adoption of this form of suicide attack was an extraordinary opportunity to turn the course of the war. The basis for its effectiveness was its sophisticated guidance system — a human pilot with the ability to instantaneously adjust to changing situations and guide his bomb-armed aircraft to the target. This pilot could theoretically select the most valuable ship for attack and then fly his aircraft into its most vulnerable part. Once at the target, the pilot was trained to release his bomb to cause additional damage before his mount became a multi-ton projectile with the added destructive power of any unused fuel still on board.

The kamikaze would make their debut towards the end of the series of engagements known collectively as the Battle for Leyte Gulf. These had gone so disastrously wrong for the Japanese that it spelled the end of the IJN as an effective fighting force. Indeed, by the time the battle had come to its conclusion, the kamikaze constituted Japan's most viable option for responding to the invasion of Leyte and future American targets in the Philippines and beyond.

The exact number of suicide attackers sent against Allied ships from October 1944 until the end of the war is difficult to determine with certainty. An accepted source states that 3,913 Japanese aircrew died conducting 3,000 kamikaze missions. This included 2,525 IJNAF and 1,388 IJAAF personnel. Of these 3,000 missions, only one-third got to the point where they conducted an attack on a ship. If they got to this point, they had about a 36 per cent chance of success. Some 367 kamikazes hit their target or gained a near-miss close enough to cause damage. In total, each kamikaze aircraft had about a 9.4 per cent chance of hitting a target, and if it did, it caused an average of 40 casualties.

The cost to the US Navy and its allies was 66 ships or craft sunk or never repaired and almost 400 damaged in some measure. Of those that never returned to service, only 39 were sunk outright. Coming up with personnel casualties is difficult, but approximately 16,000 is generally accepted as accurate. This figure includes 6,190 killed and 8,760 wounded. According to official US Navy records, "the enemy lost 784 suicide planes to score 216 hits on ships."

The B6N2 proved to be quite effective in the kamikaze role thanks to its relatively high speed. At least eight kokutai formed kamikaze units, the latter being christened Kikusui-Tenzan-tai (the 131st and 701st Kokutai), Kikusui-Ten-o-tai (901st Kokutai), Kikusui-Rai-o-tai (931st Kokutai), Mitate 2 Tenzan-tai (601st Kokutai), Mitate 3 Tenzan-tai (210th Kokutai), Hachiman-tai (761st Kokutai) and Kiichi-tai (763rd Kokutai).

> *"The B6N2 proved to be quite effective in the kamikaze role"*

A kamikaze pilot of the Kikusui-Tenzan-tai chalks the message 'Hitchin' ('Determined to Sink', indicating his determination to sink an enemy vessel) on the rudder of his B6N2 prior to taking off on his final mission from Kanoya in the pre-dawn darkness in May 1945. The vertical inscription near the bottom of the rudder reads 'Yamamoto', probably indicating the pilot's name. VIA TONY HOLMES

Early 'Jill' kamikaze actions were described in detail by Robin L Reilly in his book *Kamikaze Attacks of World War II — A Complete History of Japanese Suicide Strikes on American Ships, by Aircraft and Other Means*: "USS *Reid* (DD-369) was part of Task Unit 78.3.8 charged with escorting ten LSMs [Landing Ships (Medium)] and three LCI(L) [Landing Craft Infantry (Large)] to Ormoc Bay to resupply American forces there on 11 December 1944. Flying overhead was a CAP of four Corsairs. At 1500 hrs, snoopers began to appear on the radar screens, but they turned away out of gun range. Around 1700 hrs, 12 bogeys approached the convoy from dead ahead. They were tentatively identified as 'Jills' and the ships went on alert. As *Reid* was in the leading edge of the convoy, she took the Japanese planes under fire at 10,000 yds and turned to starboard to bring her guns to bear.

"Two of the Corsairs got behind the 'Jills' and began to attack them as the ships fired on the enemy planes. *Reid* shot down three enemy aircraft before one hooked its wing in the starboard whaleboat, pivoted over and crashed close aboard the starboard bow. The plane that delivered the coup de grace came in from astern, crashed into the No 3 gun and slid forward to the port side 40mm gun tub, where it came to rest in a flaming ball of fire. Its bomb penetrated the hull and blew up in the after magazine room, effectively ripping apart the entire stern section. In the space of about 15 seconds *Reid* had suffered two hits and five close crashes. Her depth charges went off, injuring and killing some of the men in the water. Others fell victim to Japanese planes, which strafed them until being driven off by Corsairs. *Reid* lost 103 men in the attack."

Although suicide attacks such as this were now the order of the day, B6N2 units still occasionally flew torpedo bombing missions at dawn and dusk in search of Allied shipping. Supply convoys, consisting primarily of lightly armed — and armoured — Liberty ships proved to be tempting targets, and they were routinely targeted during daylight hours by both kamikaze aircraft and dive- and torpedo bombers conducting conventional attacks.

One such convoy of 15 merchant ships carrying supplies and troops to Leyte

On 21 February 1945, USS *Saratoga* (CV-3) was struck by three 'Jills' on the forward flight deck while they were carrying out a bombing attack on the carrier during the Battle of Iwo Jima. *Saratoga* was so badly damaged as a result of this kamikaze attack that it was put out of combat commission for the remainder of the war.
NATIONAL ARCHIVES AND RECORDS ADMINISTRATION

came under attack north-east of Mindanao on 5 December 1944. A 'Jill' made a run on the Liberty ship SS *Antoine Saugrain* from the port beam, its torpedo striking the freighter in the stern and the subsequent explosion knocking off its rudder. Fifteen minutes later, another B6N2 put a torpedo in the ship's number two hold. *Antoine Saugrain* had nearly 450 US Army troops and crew on board, and they were all transferred to SS *Coronado* and SS *San Pedro*. Torpedo attacks were also made on other ships in the convoy, but none were hit. Two vessels suffered damage from bombs and kamikaze attacks, however. *Antoine Saugrain* was taken under tow, and the ship eventually sank on 6 December.

Although clearly still capable of targeting ships with torpedoes, B6N2 units resorted more and more to kamikaze strikes in the final months of the war — the 'Jill' had officially carried out its first such special attack mission in early January 1945. The B6N achieved its greatest success in this role on 21 February 1945 during the Battle of Iwo Jima, when Mitate 2 Tenzan-tai targeted the veteran carrier USS *Saratoga* (CV-3).

Attacking at dusk and taking advantage of low cloud cover and the vessel's weak destroyer screen (just three warships), six 'Jills' scored five bomb hits on the carrier in three minutes — three of the aircraft also struck the carrier. *Saratoga's* flightdeck forward was wrecked, its starboard side was holed twice and large fires broke out in the hangar deck. A total of 123 sailors were killed or listed as missing and 192 wounded. Some 36 aircraft were destroyed. The carrier was so badly damaged that it was out of commission for the remainder of the war.

Later that same day, just prior to sunset, the mine and net-laying ship USS *Keokuk* (CMc-6) was hit by a solitary 'Jill' while sailing in convoy with a group of Landing Ships, Tank south-east of Iwo Jima. *Keokuk's* crew identified the aircraft that approached from almost dead ahead as a 'Jill', and despite it being set on fire, the B6N clipped the vessel's number one 20mm gun mount and forward searchlight and disintegrated as it tore through the ship's starboard side and midships gig davit. Its bomb, estimated to be a 500lb weapon, exploded on *Keokuk's* main deck to starboard moments later. The 'Jill' and its detonating ordnance destroyed the ship's entire starboard gun battery, save for a single 20mm weapon, and started fires on board. Seventeen sailors were either killed or listed as missing, with 44 wounded.

Following these attacks, the US Navy gave the all-clear at 18.15hrs, but this proved to be only a brief reprieve, for at 18.46hrs more kamikaze aircraft appeared out of the rapidly fading light. "At least five planes", almost certainly B6N2s, were sighted by the escort carrier USS *Lunga Point* (CVE-94), then operating as part of the Support Carrier Group TG 52.2. Four of them made attack runs on the vessel, three dropping torpedoes that missed before the fourth aircraft, already hit and burning, was aimed by its pilot directly at the carrier. The 'Jill's' starboard wing clipped the island structure and then skidded across the flightdeck from the starboard side, its still-spinning propeller gouging grooves in the wooden planking prior to the torpedo bomber plunging into the water on the port side.

> **"'Jill' units resorted more and more to kamikaze strikes"**

At the same time as *Lunga Point* was being attacked, its sister-ship USS *Bismarck Sea* (CVE-95) was also engaged by a single B6N2 that was spotted approaching at very low level from the starboard side. The aircraft slammed into the carrier abeam of the aft elevator, knocking it out and reducing water pressure on board to a mere trickle. Fighting the ensuing fire in the hangar bay with hoses run from forward spaces, the damage control parties had the blaze under control until a second explosion occurred in the hangar bay immediately forward of the elevator that had originally been struck by the aircraft.

According to eyewitnesses, this second explosion was caused by another 'Jill' crashing into the ship in a vertical dive. Many of the firefighters tackling the initial blaze were killed. Worse still, it also ignited several fuelled fighters that had previously been struck down to the hangar bay to facilitate the recovery of airborne aircraft, including some from the already-crippled *Saratoga*. The conflagration at the rear of the ship raged out of control from this moment on, with exploding 20mm and 40mm ammunition adding to the devastation. 'Abandon ship' was soon declared and *Bismarck Sea* sank after 21.00hrs, taking 318 crew with it. It was the last American carrier to be sunk in World War Two.

Although the *Saratoga* had sailed some distance away from Iwo Jima by the time the escort carriers were attacked, that did not prevent it from being targeted again. At 18.46hrs, at least three aircraft — again, almost certainly 'Jills' — were spotted overhead, the first two being shot down by the ship's gunners. The third hit the carrier with a bomb prior to crashing into the water.

The carriers' dusk attackers were probably 'Jills' of the 4th and 5th Kogekitai (Special Attack), originally assigned to the 254th Hikotai. The four aircraft from the 4th Kogekitai were each armed with a single 1,764lb No 80 Mk5 Land Bomb, while the quartet of B6N2s from the 5th Kogekitai carried torpedoes. It was the latter that targeted *Lunga Point*, whose crew were the only ones to identify their attackers correctly, thanks in no small part to the starboard wing and landing gear left on the flightdeck by the B6N that struck the carrier. The poor light, along with the fact of the 'Jills' carrying their unwieldy Type 91 air-dropped torpedoes, probably contributed to their being mistaken for larger twin-engined G4M 'Betty' bomber by the other ships in TG 52.2. The attacks on 21 February were the only serious attempts made by Japanese aircraft to disrupt the landings at Iwo Jima.

'Jills' were also frequently encountered in the skies over Okinawa as the IJNAF and JAAF desperately attempted to repel the invasion of the island from 1 April. Although not seen in the same numbers as 'Vals' and Zero-sen, it appears B6N2s possibly sunk as many as three US Navy destroyers — including USS *Bush* (DD-529), which was hit by three aircraft on 6 April — and badly damaged the carrier USS *Intrepid* (CV-11) on 16 April.

'Jills' targeted the destroyer USS *Brown* (DD-546) on 10 May while the ship was performing screening duties west of Okinawa. Its crew initially spotted an aircraft closing on the vessel's starboard quarter just above the wave tops at 08.43hrs. This was taken under fire and shot down shortly thereafter at close range. Three minutes later, another aircraft was sighted on the starboard beam following a similar flight profile and it too was shot down, although further out this time. Both aircraft were identified as 'Jills', and a subsequent search of the water where they had crashed yielded the bodies of three Japanese airmen and other debris.

Assuming the three airmen were recovered from the same unit, allied with the lack of an attempt by either aircraft to drop torpedoes, it would suggest the attackers targeting *Brown* were two B6Ns from the Kikusui-Rai-o-tai. These aircraft had been led aloft from Kushira by Lt(jg) Saburo Umetani, each 'Jill' being armed with a single 1,764lb bomb.

Attacks such as the one on *Brown* were usually undertaken by B6Ns armed with a single large bomb, although on a handful of occasions Type 91 torpedoes were also used, most notably when 'Jills' of Mitate 2 Tenzan-tai targeted Allied warships off Iwo Jima in February 1945. Crews flying these aircraft were expected to launch their torpedoes at their targets before following up with a kamikaze attack, instead of crashing into a ship without first dropping their ordnance like most bomb-carrying aircraft.

None of the dedicated kamikaze operations by torpedo-carrying B6Ns were known to be effective. Although the radar picket destroyer USS *Twiggs* (DD-591) was sunk on the night of 16 June 1945 off western Okinawa after being hit by a torpedo and then crashed into by the 'Jill' that dropped the weapon, this was most likely a case of an improvised suicide attack rather than a pre-planned kamikaze operation. The vessel had just been hit in the port side by a torpedo dropped by the aircraft and had barely recovered when the B6N pilot, evidently determined to finish the ship off, circled back around and slammed into it aft. His sacrifice, and that of his crew, was probably superfluous for the torpedo caused the most damage, having hit near the forward 5in guns and started a fire that raged out of control. When the blaze reached the magazine for the number two turret the ammunition stored within it promptly blew up, sinking the destroyer within minutes and taking 152 crew down with it.

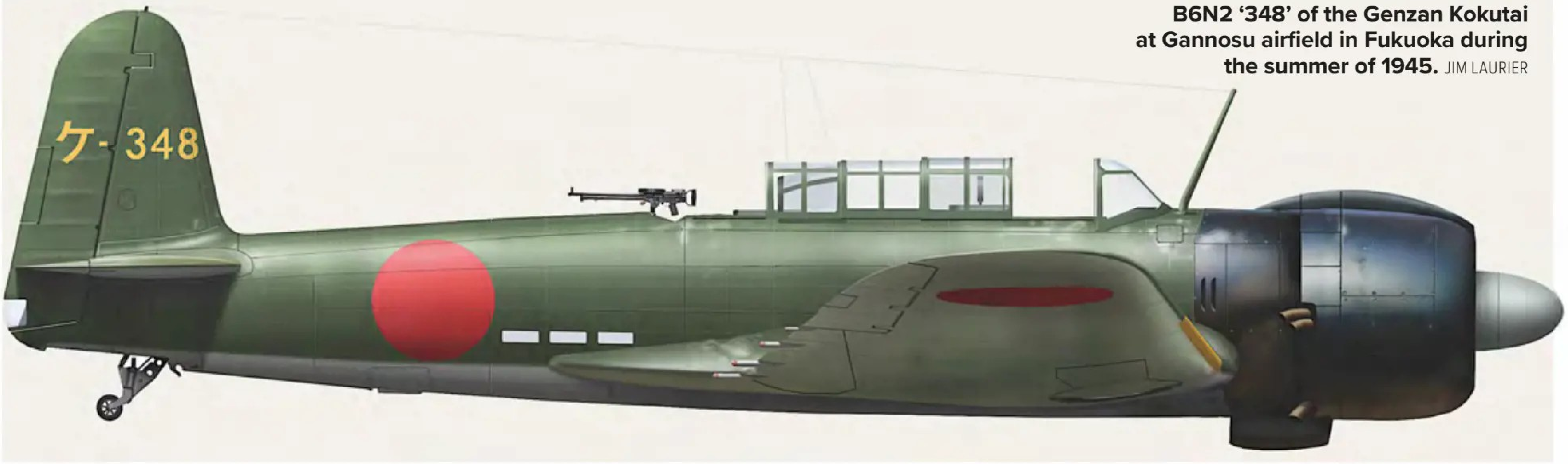
Small numbers of 'Jills' continued to be shot down by US fighters flying CAP missions for the Pacific Fleet through to the very last days of World War Two, the final two B6Ns being claimed on the afternoon of 13 August 1945.

Fully manned, a B6N2 from the Kikusui-Tenzan-tai departs Kanoya on a special attack mission in May 1945. Kanoya served as the focal point of the IJNAF's kamikaze efforts, being the primary airfield from which it launched such strikes. VIA TONY HOLMES

DATAFILE

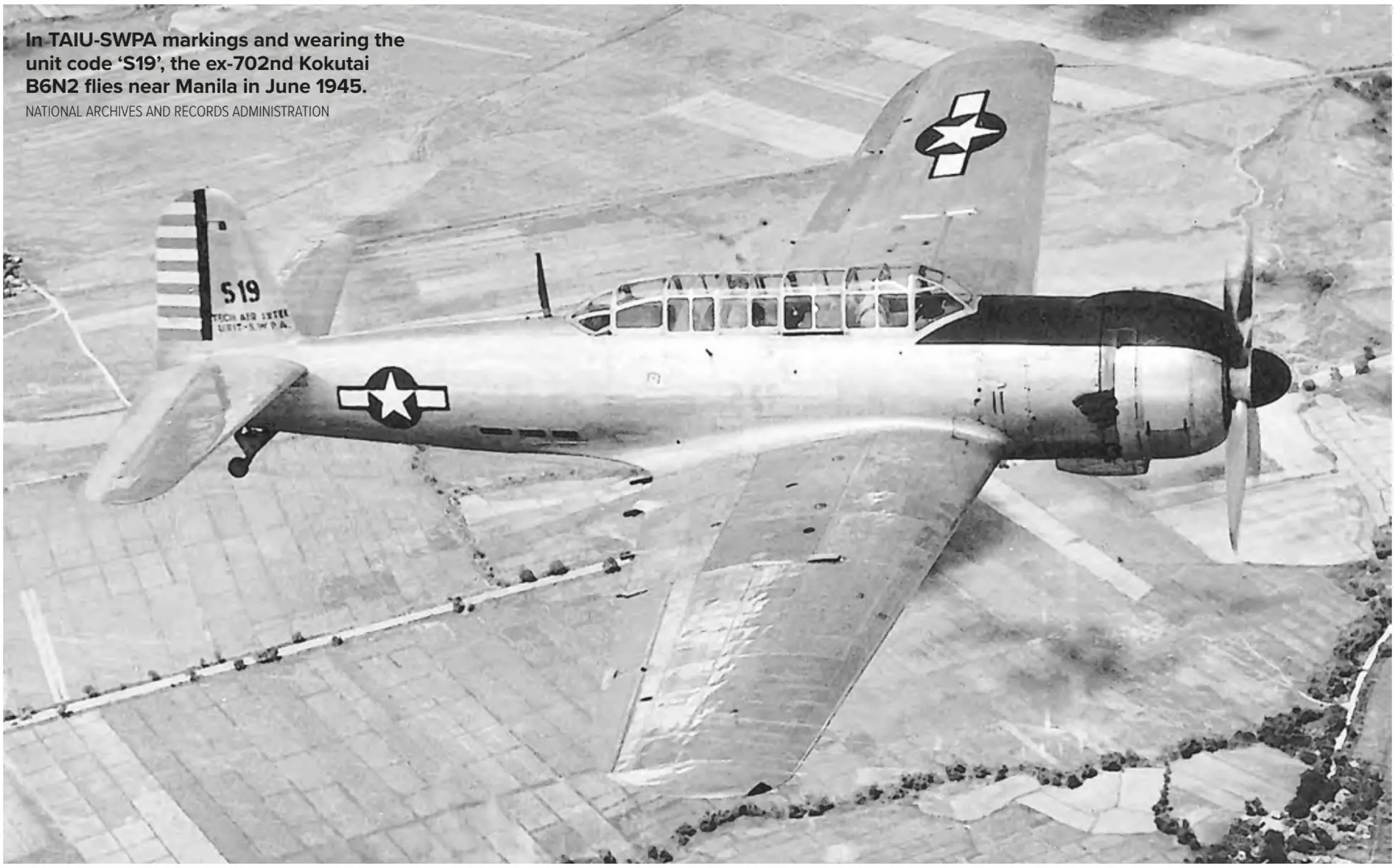
PACIFIC SUB-HUNTERS

Assigned to the special attack flight of the Genzan Kokutai during the defence of Okinawa, '348' inexplicably survived the war — probably due to serviceability issues — and was discovered in a sorry state at Gannosu airfield, in Fukuoka prefecture, by occupying US forces in September 1945. Radar-equipped B6Ns were known to have flown anti-submarine warfare missions along the north-western coast of Japan from Gannosu, and this aeroplane may have participated in such flights also. Typically, a B6N2 fitted with the 3-Shiki Type 3 ASV radar would lead two standard 'Jills' like '348' on a patrol, often at night or in poor weather, when Allied submarines were most active. The crews of the 'radarless' aircraft would rely almost exclusively on radar data relayed to them via radio from the lead 'Jill' for guidance.



B6N2 '348' of the Genzan Kokutai at Gannosu airfield in Fukuoka during the summer of 1945. JIM LAURIER

What was the American view of the 'Jill', based on evaluation of a captured B6N2?



In TAIU-SWPA markings and wearing the unit code 'S19', the ex-702nd Kokutai B6N2 flies near Manila in June 1945. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION

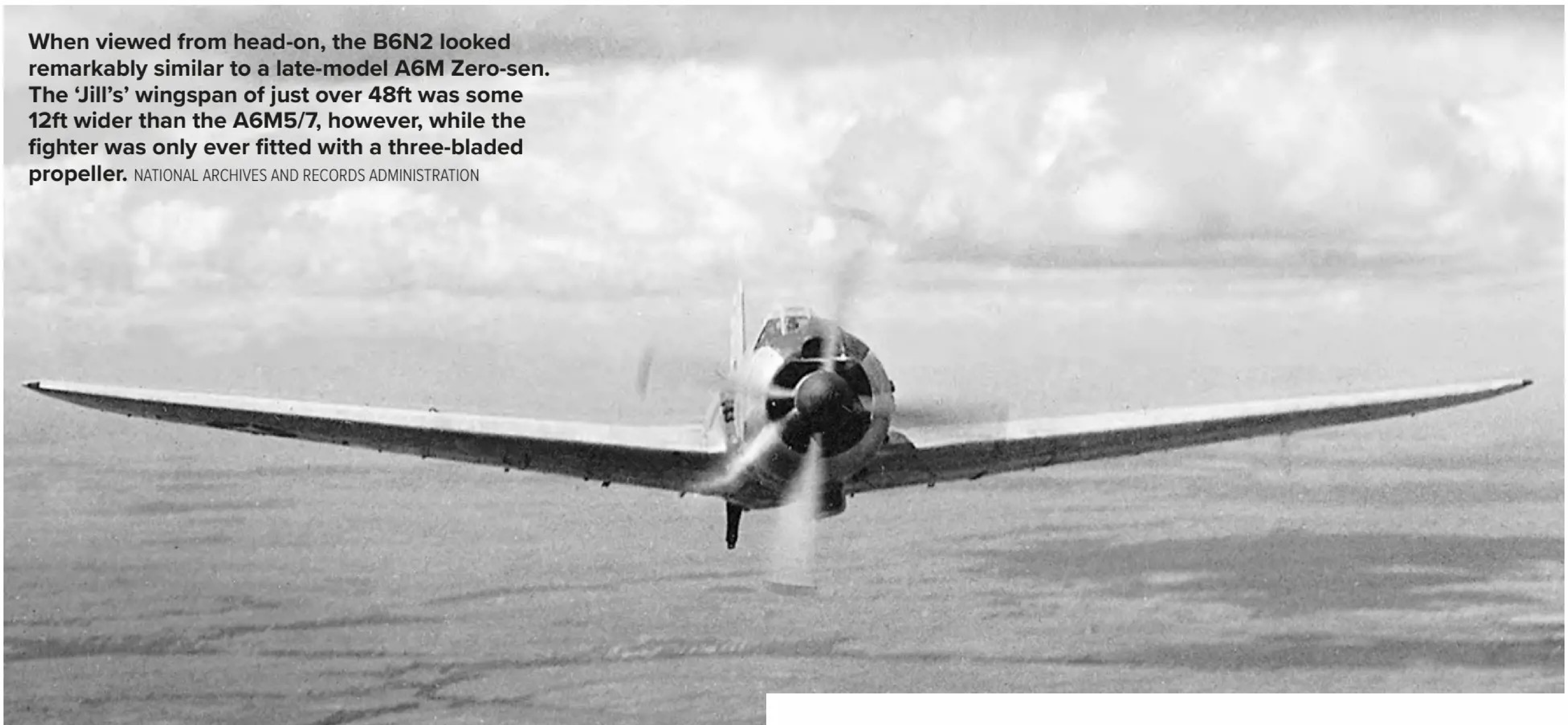
In February 1945, a B6N2 — purportedly from the 702nd Kokutai — was captured intact at Clark Field following its liberation by US troops. The aircraft was quickly stripped to bare metal and Technical Air Intelligence Unit-South West Pacific (TAIU-SWPA) markings, including a striped rudder, were applied. Restored to airworthy condition, the 'Jill' underwent technical evaluation and flight-testing from the airfield.

The TAIU-SWPA's technical evaluation of the aircraft was recorded in a brief entry in the Technical Air Intelligence Center (TAIC) Summary Manual No 1 that appeared in February 1945: "'Jill' is a torpedo bomber designed to replace 'Kate'. 'Jill 11' [B5N1] is similar to 'Jill 12' [B5N2], except that 'Jill 11' uses the Mamoru 11 engine. The performance of the two models is essentially the same, except for a higher critical altitude on 'Jill 12'. Maximum speed of 'Jill' is 345mph at 18,600ft.

"Ineffective fuel tank protection and light armament together with no evidence of armor indicates that 'Jill' has no decided advantage over 'Kate' except in speed and climb. There is evidence of radar being installed on 'Jill'". This aircraft was probably scrapped following its technical evaluation by the TAIU-SWPA.

With the occupation of Japan in September 1945, two more B6N2s were

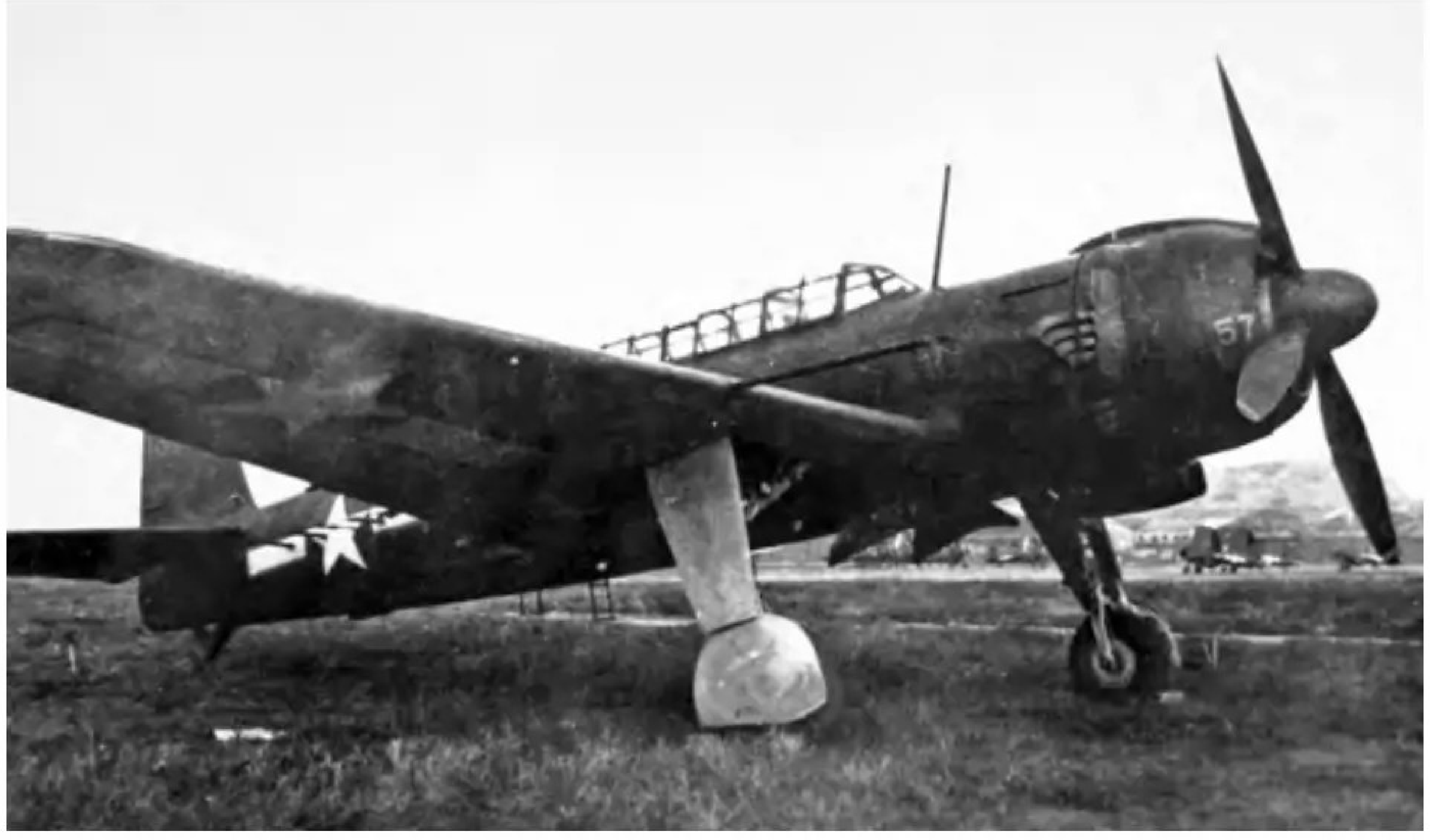
An exotic variety of IJNAF and IJAAF fighter, reconnaissance and dive-bomber types — 45 in total — were lashed down to the flightdeck of the escort carrier USS *Barnes* (CVE-20) in Yokosuka harbour in November 1945. A lone B6N2, with its wings folded, is visible in the centre. VIA TONY HOLMES



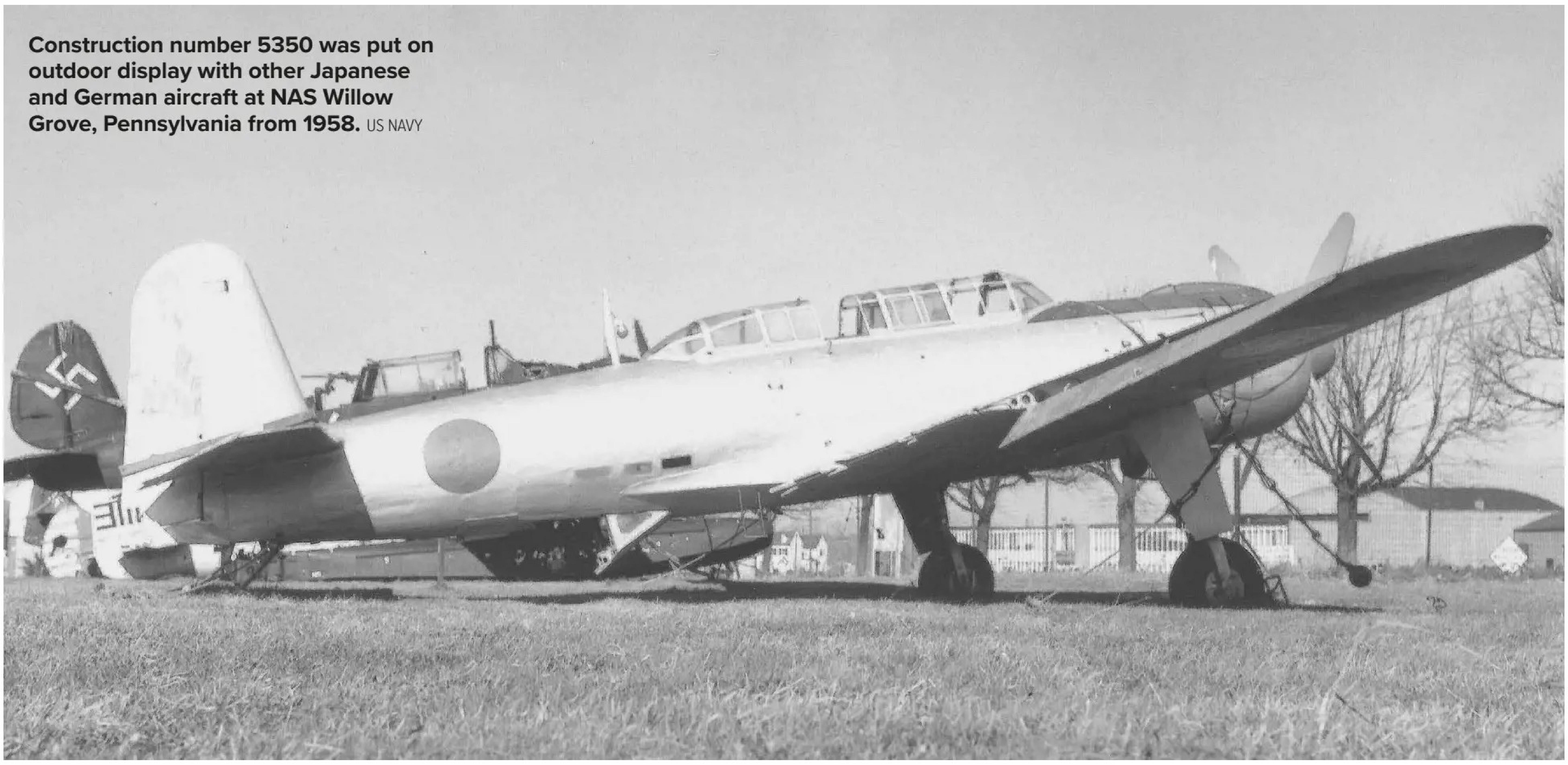
When viewed from head-on, the B6N2 looked remarkably similar to a late-model A6M Zero-sen. The 'Jill's' wingspan of just over 48ft was some 12ft wider than the A6M5/7, however, while the fighter was only ever fitted with a three-bladed propeller. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION

captured by US ground forces at Suzuka airfield. Both 'Jills' were among the 145 captured Japanese aircraft that were shipped to America on board three US Navy escort carriers for evaluation, the B6N2s departing Yokosuka on the flightdeck of USS *Barnes* (CVE-20) on 3 November 1945.

By May 1946, the aircraft were at the Middletown Air Depot in Harrisburg, Pennsylvania, where one was later scrapped. Construction number 5350 survived, however, being put on outdoor static display with other Japanese and German types at Naval Air Station Willow Grove, Pennsylvania, from 1958. The sole surviving example of its type in the world, the aircraft was acquired by the National Air and Space Museum in 1981 and placed in storage at its Paul E. Garber Facility, also known as Silver Hill, in Suitland, Maryland. The B6N2 remains there, kept in a dismantled state.



Numbered '57' on the engine cowling, this captured, radar-equipped B6N2 is probably the example which no longer survives out of the two that are known to have ended up in the US. It may be pictured following its arrival at Norfolk, Virginia, given the Corsairs in the background. ALAMY



Construction number 5350 was put on outdoor display with other Japanese and German aircraft at NAS Willow Grove, Pennsylvania from 1958. US NAVY

KEY Publishing

THE DESTINATION FOR
AVIATION ENTHUSIASTS

Visit us today and discover all our latest releases

FULL FLIGHT TEST:
BEECHCRAFT C24R SIERRA
A solid, characterful and rare classic
AIR FRANCE FLIGHT 4590
Is it right to blame the crew? Concorde pilots disagree
Pilot
Est. 1967 Britain's best selling General Aviation magazine
April 2025
Aura Aero Integral
First look at an aerobatic trainer with fine French heritage
G-BZPG

April 2025 issue of Pilot magazine takes a first look at Aura Aero Integral, an aerobatic trainer with fine French heritage. Derived from Mudry's fabled CAP designs and taken from concept to certification in six years,
it is a new French trainer that will appeal to anyone interested
in aerobatics training, UPRT and sports flying.

Concorde Conspiracies, Concorde Truths, a feature written by Pat Malone, reveals the true cause of the accident that killed all onboard Air France Flight 4590 is in danger of being obscured by conspiracy theories put forward by one former Concorde pilot, say many of his BA flight crew contemporaries, defending the honour of their French counterparts.

Plus, there's a full flight test of the Beech C24R Sierra – the sole Sierra on the UK register and a Piper Arrow and Cessna Cardinal RG competitor that is unique in more than one sense of the word.

Order from our online shop...

shop.keypublishing.com/collections/pilot-magazine

Call **+44 (0)1780 480404** *(Monday to Friday 9am - 5.30pm GMT)*

**Free 2nd class P&P on BFPO orders. Overseas charges apply.*

329/25

PHOTO: KEITH WILSON

KEY Publishing

THE DESTINATION FOR AVIATION ENTHUSIASTS

Visit us today and discover all our latest releases

From the publishers of FlyPast
GERMANY'S AIR ASSAULT 1939-1945
LUFTWAFFE
OVER BRITAIN
SECOND EDITION
THE BLITZ, BATTLE OF BRITAIN, CAPTURE, AND DEFEAT FROM THE GERMAN PERSPECTIVE
THE BATTLES
THE MEN
THE MACHINES
KEY

Few in Britain would avoid the reach of the Luftwaffe during World War Two.

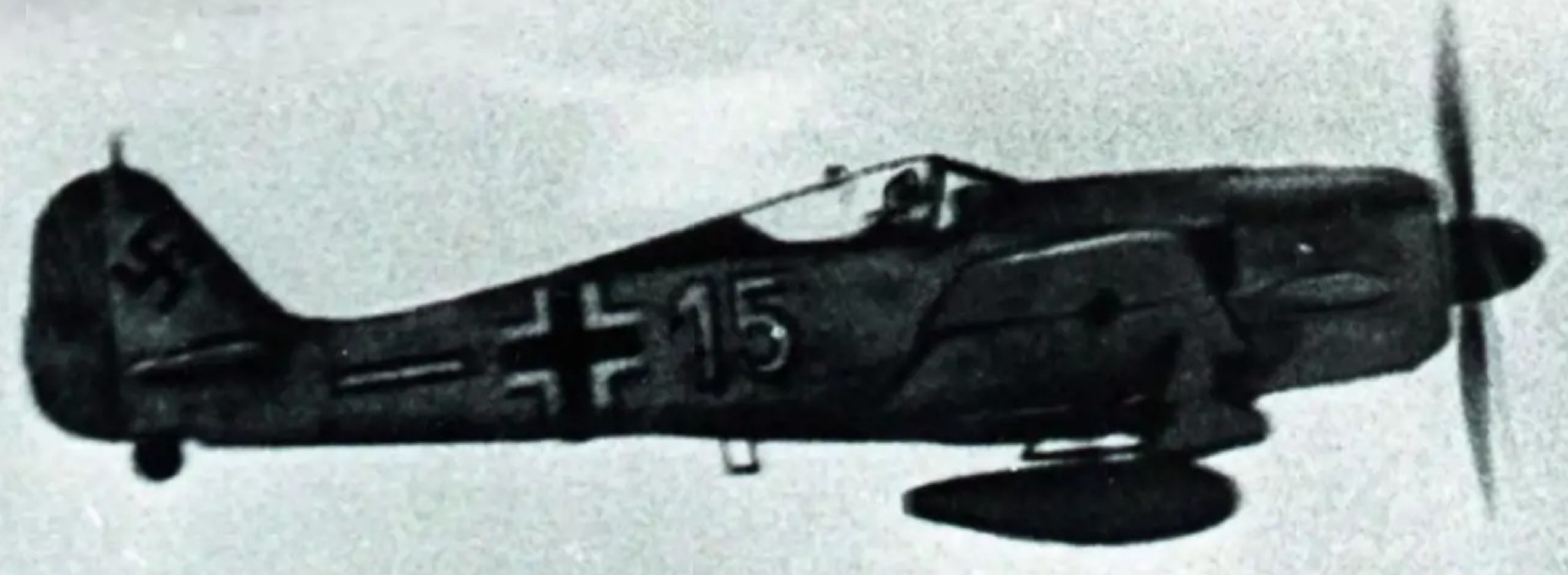
Even in the first six months of 1940, its early raids against maritime targets dwarfed in scale the sorties conducted by the Luftstreitkräfte in the previous war.

While an invasion force readied to cross the Channel, the Luftwaffe threatened to dismantle the key to Britain's defences - the RAF - in one of the largest aerial campaigns of that global conflict.

The battle for air superiority was quickly followed by the world's first ever large-scale sustained bombing campaign - the Blitz - the assault on British cities and on the morale of its people. Britain endured, while the Luftwaffe failed.

By D-Day in 1944, the raids had become infrequent, opportunistic and costly on the aggressor.

This is the incredible story of the four-year air campaign that, for the first time in modern history, transformed large areas of Britain into a major conflict zone.



Order from our online shop...

shop.keypublishing.com/luftwaffeoverbritain

Call +44 (0)1780 480404 *(Monday to Friday 9am - 5.30pm GMT)*

**Free 2nd class P&P on BFPO orders. Overseas charges apply.*

Reviews

REVIEWS RATING

★★★★★ Outstanding

★★★★☆ Excellent

★★★☆☆ Good

★★☆☆☆ Flawed

★☆☆☆☆ Mediocre

Enough said

The latest books for the discerning aviation enthusiast

BOOK of the MONTH

From Blériot to Spitfire

edited by Scott Butler
published by
Crowood Press

FROM
BLÉRIOT TO SPITFIRE
FLYING THE HISTORIC AEROPLANES OF THE SHUTTLEWORTH COLLECTION
SHUTTLEWORTH

For some readers, this will be a blast from the past; for others, something wholly new. The late David Ogilvy, for so many years the Shuttleworth Collection's general manager and then display organiser, first compiled *From Blériot to Spitfire* in 1977, the concept being to describe a selection of Shuttleworth's aeroplanes from the perspective of their pilots — of which he was also one. It was most recently updated in 1991, making the appearance of a new edition long overdue, given the scope of subsequent additions to the collection.

Current Shuttleworth pilot Scott Butler has taken on the Ogilvy role in bringing together 2025's version, and stayed true to a successful formula. Augmenting some of the original contributions by luminaries such as Roland Beamont, Neil Williams, John Lewis and Desmond Penrose are a host of new pieces by today's roster, plus some penned by others in the intervening years. All are absolutely in the same easy-to-read yet highly insightful vein as those by their forebears. It's perhaps unfair to pick highlights, but of the new chapters the chance to read 'Dodge' Bailey's views on the Sopwith Triplane and Camel is much to be welcomed, while Mark Sharp writes especially well on the Parnall Elf, Miles Hawk Speed Six and Comper Swift.

As Butler notes in his introduction, there has been "minimal editing" to the older chapters, hence comments such as Ogilvy's from 1977 that a three-strong Miles Magister formation "is the most that the world can hope to muster in the years to come", when 2022 brought an amazing five together at Old Warden. This melding of the old and the new works very well, not least through the inclusion of a chapter from the present-day engineers' perspective, and the production standards are pleasingly high in all respects. Even if you have any or all of the originals in your library, buy this new edition. It's highly recommended. ***Ben Dunnell***

ISBN 978-0-7198-4481-2; 10.5 x 8.75in hardback; 208 pages, illustrated; **£28**

★★★★★

Q-Birds

by Frederick A. Johnsen
published by Crécy Publishing

Those even moderately versed in US military aircraft designations will know immediately what the title refers to, even without seeing the sub-title: 'American Manned Aircraft as Drones.' Johnsen chronicles these types in a degree of detail not previously seen in a single volume, taking in both the air force and navy. The earliest projects he covers are the motley array of pre-war efforts using otherwise surplus aeroplanes; the most recent is the QF-16, the US Air Force's current full-scale aerial target. In between, every programme has its development and use examined in great depth, the very well-written text making much use of official reports. It is a fair bet you'll find out a great deal you never knew before; for instance, I was well aware B-17s were employed as drones, but I had no idea of the scope of such activity.

Many of these machines sported liveries brighter than the norm, and this is where the absolutely superb range of imagery comes into its own. Period colour photos date back as far as some wonderful early post-war shots of US Navy F6F Hellcat drones, largely red but with tails of different hues, and one I've never seen of two far plainer B-17s — a drone and drone director — in close formation over the Roswell test site. Augmenting these are first-rate side-view artworks, while many of the later 'Q-birds' have, of course, been captured more copiously in colour. Reproduction is pretty much faultless, too, and the layout makes best use of the material. A very fine work in every respect. ***BD***

Q-Birds
American Manned Aircraft as Drones
NAVY
Frederick A Johnsen

ISBN 978-1-80035-279-7; 12.0 x 8.5in hardback; 208 pages, illustrated; **£34.95**

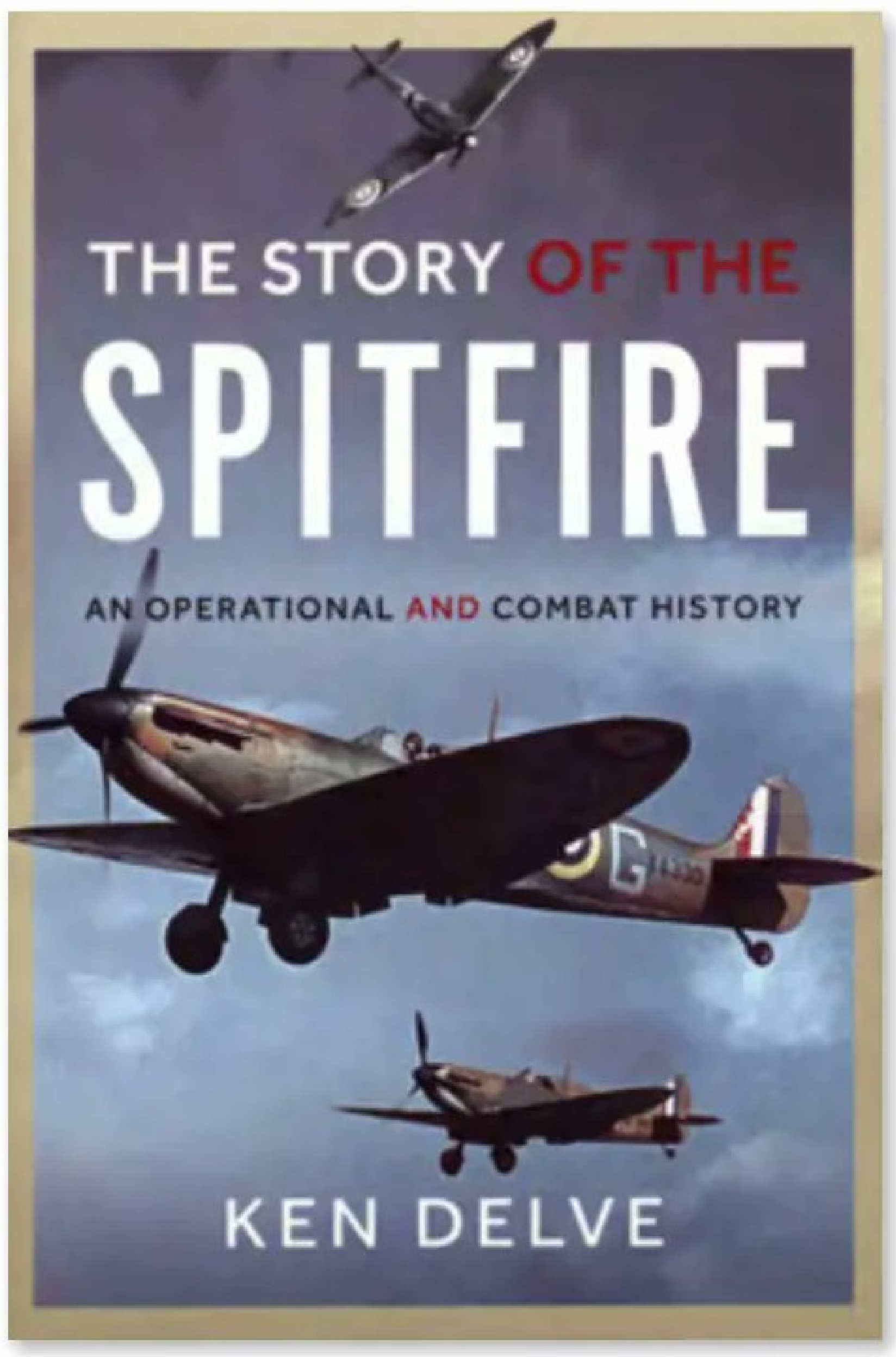
★★★★★

The Story of the Spitfire: An Operational and Combat History

by Ken Delve
published by Air World

Here, the author takes on the challenge of summarising the complex story of the Spitfire in just 272 pages, promising, "An Operational and Combat History". How best to do that given the breadth of the topic? His approach — as familiar as it sounds — is to chronicle the Spitfire story, from the first flight in March 1936 of prototype K5054 through World War Two to post-war use and the Spiteful and Seafang that marked the end of the line, in a concise account which does not waste words, avoids clichés and remains at all times readable.

Fleet Air Arm operations are accorded their own chapter, and mention is made of Spitfires used by US Army Air Forces and US Navy units, but the emphasis is very much on the RAF. There's good analysis of how the Spitfire was developed to meet the threat of improved Luftwaffe Bf 109s and Fw 190s, backed up by official evaluations and combat reports from pilots who



took it into battle. A hundred pages are given over to 15 annexes (appendices) which present tables, listings and much detailed information, and there's a 16-page photo section with decently reproduced black-and-white images. In summary, this volume provides as much information on the Spitfire as many others in larger page format and with twice the number of pages. ***Denis J. Calvert***

ISBN 978-1-03615-004-4; 9.5 x 6.4in hardback; 272 pages, illustrated; **£25.00**

★★★★

Mediterranean Sweep

by Thomas McKelvey Cleaver
published by Osprey

Foreword by
Colonel Ralph Wetterhahn, USAF (Ret.)
THOMAS McKELVEY
CLEAVER
MEDITERRANEAN
SWEEP
The USAAF in the Italian Campaign
Osprey

The first impressions are good. The striking colour — or, at least, coloured — illustration on the dust jacket features a US Army Air Forces B-25J in overall aluminium finish with, on the upper surfaces and in large red lettering, the legends ‘FINITO BENITO’ (port wing) and ‘NEXT HIROHITO’ (starboard wing). This aircraft, 44-30092, was on the strength of the 12th Bomb Group in 1943-44 and flew missions over Sicily and Italy, its paint scheme celebrating Mussolini’s downfall in July 1943 and the subsequent armistice.

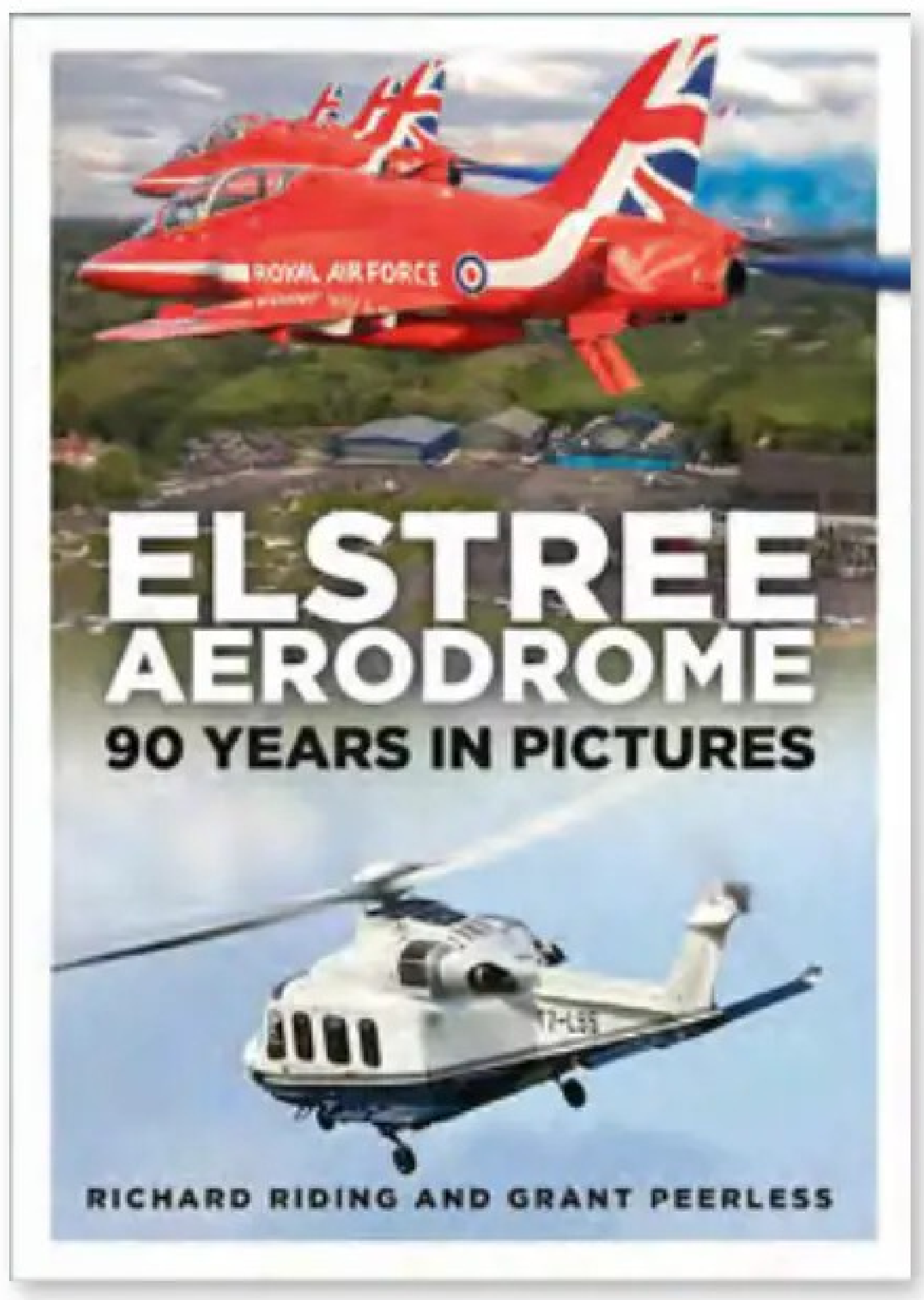
Using plenty of first-hand quotes, the author relates the air war that took place over Italy and the Mediterranean from mid-1943 involving AAF, RAF and Commonwealth forces and even a P-47-equipped squadron of the Brazilian Air Force. His account, which centres on the activities of the AAF, is detailed and high on facts and figures: for instance on page 17, “the Germans had managed to evacuate 38,846 troops and 10,356 vehicles including 94 assault guns and 50 tanks, along with 14,946 tons of fuel and ammunition”. This, though, should not be seen as a criticism, as it in no way affects this volume’s readability. The illustrations are monochrome, well-reproduced but few in number and confined to a single eight-page photo section. ***DJC***

ISBN 978-1-4728-6345-4; 9.5 x 6.3in hardback; 320 pages, illustrated; **£25.00**

★★★

Elstree Aerodrome: 90 Years in Pictures

by Grant Peerless and Richard Riding
published by The History Press



The much-missed Richard T. Riding, founder editor of this magazine, chronicled the goings-on at Elstree like no-one else. He and Grant Peerless produced *Elstree Aerodrome: The Past in Pictures* during 2003, and this new paperback edition — dedicated to ‘RTR’, who died in 2019 — brings things up to date. It must be said, ‘90 Years in Pictures’ is something of a misnomer, as there are plenty of words here too, whether in the chapters of text on residents through the years, or in the extended photo captions. What a selection of types and characters is contained within, and some delightful anecdotes. I love the one about the commentator on a display by a London Aero & Motor Services Halifax at a 1947 event remarking “upon the aircraft’s lousiness”, even though he was its operator’s managing director!

If one criticism is to be made, it’s that all the photos inside are in black-and-white — even those in the last section, ‘Events since 2003’, which are presumably colour shots. This does seem a pity, not least since the good standard of reproduction displayed throughout would no doubt have seen these images being used to best effect. One of them shows an ex-RAF Sea King HAR3 from the Chard-based Historic Helicopters fleet dressed up as a ‘Marine One’ VH-3 for filming work. Now that I’d certainly have liked to see in all its glory. ***BD***

ISBN 978-1-80399-598-4; 9.6 x 6.75in softback; 224 pages, illustrated; **£22.99**

★★★

HEATHROW
AIRPORT
THE POST-WAR YEARS
CHARLES WOODLEY

Heathrow Airport: The Post-War Years

by Charles Woodley
published by Amberley Publishing

No, this fairly small softback doesn’t take in all of Heathrow’s post-war era. Instead its scope is far more manageable, covering the time between the inauguration of the new London Airport in 1946 to the late 1950s, when the new central area opened for business. All the significant events are featured in Woodley’s text, particular interest being found in part of the opening chapter which describes how the Heath Row — as it was styled then — site was selected and transformed, taking in what had been the Fairey company’s Great West Aerodrome among large amounts of other land. Accounts of the airport’s early days are always worth a read, and Woodley offers a good one here, explaining well just how rudimentary the facilities were to begin with and chronicling their rapid subsequent development, as well as the carriers and aircraft that used them.

Photos have been amassed from a wide range of sources and are well-captioned, even if, regrettably, the designer has used some too large for their resolution, and reproduction varies. A bit of Photoshop work — other editing software is available — would have been worthwhile and ought not to take too long, though it must be said the design isn’t the most inspiring. Nevertheless, a nice little volume. ***BD***

ISBN 978-1-3981-1761-7; 9.2 x 6.5in softback; 96 pages, illustrated; **£15.99**

★★★

BOOKS

BOMBER COMMAND BOOKS
Publishers of Military and Civil Aviation Books
www.bombercommandbooks.com

York Military Books

New & Pre-owned Military, Naval & Aviation Books.

Pre-owned model kits, wargaming & diecast models & figures.

Collections of any of the above wanted.

Best prices paid. Prompt, professional service.

Tel: 01423 360828
www.yorkmilitarybooks.co.uk
www.ebay.co.uk/str/yorkmilitarybooks

ANGUS MANSFIELD

Rare and second hand Aviation Books for sale
Based in Cornwall with visitors by appointment

Tel: 07595 403931
Email: angus@amaviationbooks.co.uk
www.amaviationbooks.co.uk

MODELS WANTED

ALL PLASTIC MODEL KITS WANTED

Unmade or already built, any quantity, especially large collections, also diecast models & books. Will collect nationwide and pay best cash price.

Please call 01202 976974 or 07901-890461
Email: mspicer68@hotmail.com
Thanks.

ENTHUSIASTS FAIR

THE HEATHROW AIRCRAFT ENTHUSIASTS FAIR returns on Sunday 30th March 10.30 / 15.00. Kempton Park Racecourse, Staines Rd East, Sunbury-On-Thames, TW16 5AQ. 07903 848726 **www.aircraftenthusiastfair.co.uk**

FLIGHTSIM

NEW, USED & REAL AIRCRAFT COCKPIT PARTS
GLB
FLIGHT PRODUCTS
www.glbflightproducts.co.uk

MEDALS

We specialise in British and World Orders, Decorations and Medals and carry an extensive range of general militaria from both Great Britain and around the world.

LONDON MEDAL COMPANY

www.london-medals.co.uk
Call: 020 7836 8877

MAY 2025 ISSUE
Copy deadline: **19th March** • On Sale: **10th April**

WANTED

Model Railway & Collectables

Top Prices Paid

For all makes, all gauges and live steam, aeroplane kits, boats, die cast etc.

Instant cash paid

Will travel to collect

LITTLEWORTH MODELS

email: littleworthmodels@gmail.com

Mob: 07578 708785
Tel: 01778 594604

26A Meadowgate,
Bourne, Lincolnshire,
PE10 9EZ

The **MAY 2025 ISSUE** goes on sale in the UK on **10 APRIL 2025**
Contents subject to change

NEXT MONTH

VICTORY 80

Our writers pick the most important events of the 1939-45 European air war

KEY COLLECTION

U.S. AIR FORCE
BEN DUNNELL

SPECIAL

HISTORIC AVIATION 2025

Get out and about, go flying, get involved

VIA MIKAEL FORSLUND

DATABASE

SAAB SCANDIA

AEROPLANE

Editorial

Editor: Ben Dunnell
E-mail: ben.dunnell@keypublishing.com
News Editor/Editorial Assistance: Tony Harmsworth
E-mail: tony.harmsworth@keypublishing.com
Regular Contributors: Denis J. Calvert, Richard Crockett, James Kightly, Chris Sandham-Bailey, Steve Slater, Barry Wheeler
Design: Paul Sander, Panda Media
E-mail: paul@panda-media.co.uk

Advertising

Group Advertising Manager: Sam Clark
E-mail: sam.clark@keypublishing.com
Media Sales Executive: Sarah Elmore
E-mail: sarah.elmore@keypublishing.com
Tel: +44 (0)1780 755131 Ext 117
Advertisement Production Manager: Rebecca Antoniades
E-mail: rebecca.antoniades@keypublishing.com

Print Procurement Manager: Andrew Svoboda
Head of Design and Production: Lee Howson
Publisher: Brodie Baxter
Group CEO: Adrian Cox

Subscriptions/Mail Order

PO Box 300, Stamford, Lincs, PE9 1NA, UK
Tel +44 (0)1780 480404; Fax +44 (0)1780 757261
E-mail: Subscriptions: subs@keypublishing.com
E-mail: Mail Order: orders@keypublishing.com
Or order online at shop.keypublishing.com

Aeroplane Monthly, ISSN 0143-7240 (USPS 16220) is published monthly by Key Publishing Ltd, PO Box 300, Stamford, Lincolnshire, PE9 1NA, UK.

Airfreight and mailing in the USA by agent named World Container Inc., 150-15, 183rd St, Jamaica, NY 11413, USA.

Periodicals postage paid at Brooklyn, NY 11256

Postmaster: Send address changes to *Aeroplane Monthly*, Air Business Ltd, c/o World Container Inc., 150-15, 183rd St, Jamaica, NY 11413, USA

Subscription records are maintained at Key Publishing Ltd, PO Box 300, Stamford, Lincolnshire, PE9 1NA, UK.

Air Business Ltd is acting as our mailing agent.

Distribution

Seymour Distribution Limited:
+44 (0)20 7429 4000

STORE FINDER
To find a stockist near you, visit www.aeroplanemonthly.com

Printing

William Gibbons Ltd, Willenhall, UK
ISSN: 0143-7240

All rights reserved. The entire content of *Aeroplane* is © Key Publishing 2025. Reproduction in whole or part and in any form whatsoever is strictly prohibited without the prior permission of the Publisher. **Publisher:** Brodie Baxter

While every care is taken with submissions, the Publisher cannot be held responsible for any loss or damage incurred. All items submitted for publication are subject to our terms and conditions which are regularly updated without prior notice and downloadable from www.keypublishing.com.

We are unable to guarantee the bona fides of any of our advertisers. Readers are strongly recommended to take their own precautions before parting with any information or item of value, including, but not limited to, money, manuscripts, photographs or personal information in response to any advertisements within this publication.

PUBLISHED MONTHLY BY
Key Publishing Ltd, PO Box 100, Stamford, Lincs, PE9 1XQ
Tel +44 (0)1780 755131 Fax +44 (0)1780 757261
Website: www.keypublishing.com

YORKSHIRE
AIR
MUSEUM

ALLIED AIR FORCES MEMORIAL

AMAZING MACHINES

Incredible stories

HONOUR | EDUCATE | INSPIRE

Over 60 aircraft and vehicles, including 'Friday the 13th' - the only Halifax MkIII in existence

From the earliest fliers to supersonic jets, nuclear bombers to submarine hunters

Based on the site of a WW2 RAF bomber base with many of the original buildings surviving

YORKSHIRE
AIR
MUSEUM
ALLIED AIR FORCES MEMORIAL
40
1985 - 2025
CELEBRATING OUR PAST | SECURING OUR FUTURE

YORKSHIRE
AIR
MUSEUM
ALLIED AIR FORCES MEMORIAL

ALL ENQUIRIES

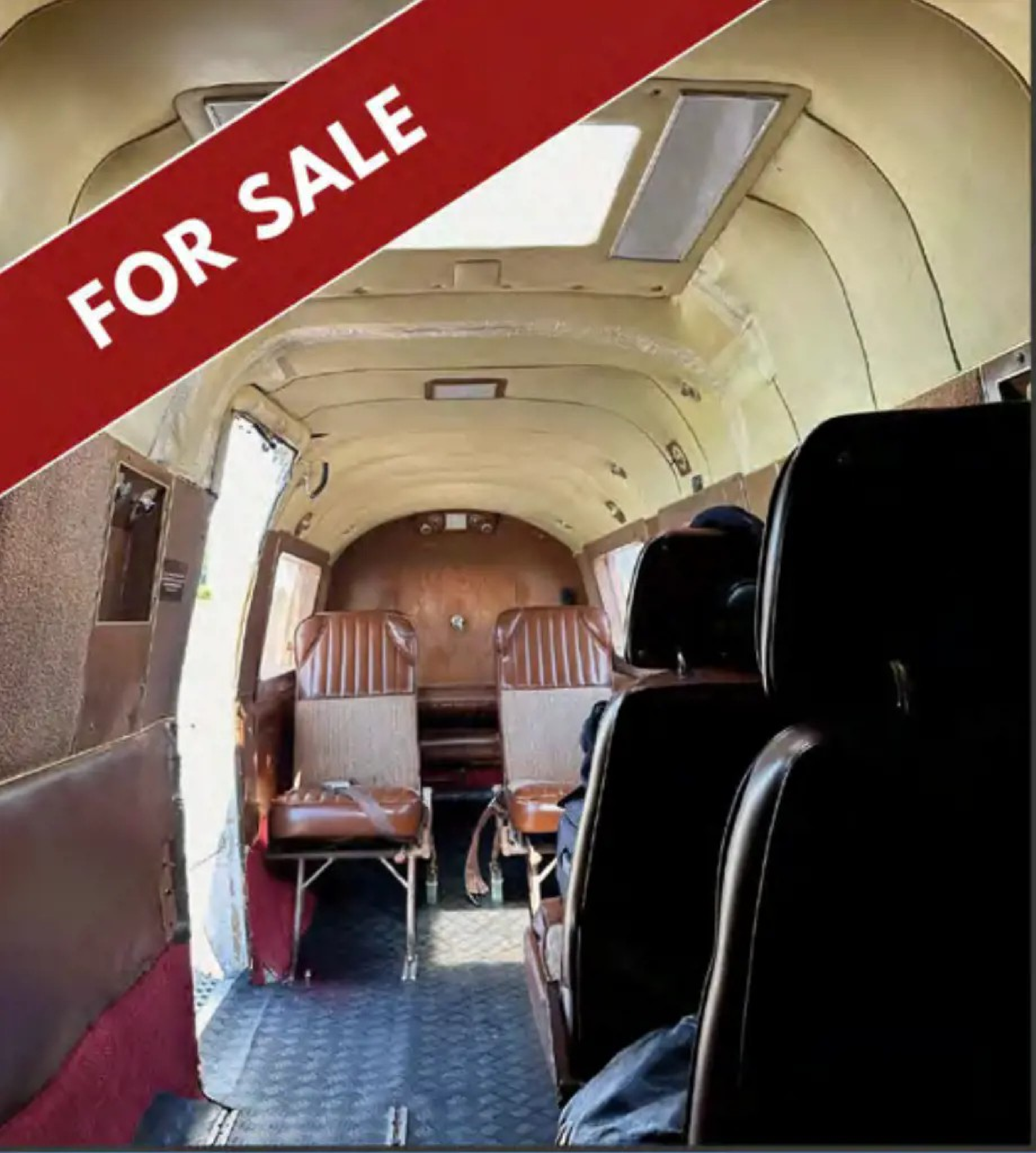
www.yorkshireairmuseum.org

HALIFAX WAY | ELVINGTON | YORK | YO41 4AU

Travellers' Choice 2023

Follow us:

Accredited Museum No 66. Registered Charity 516766.

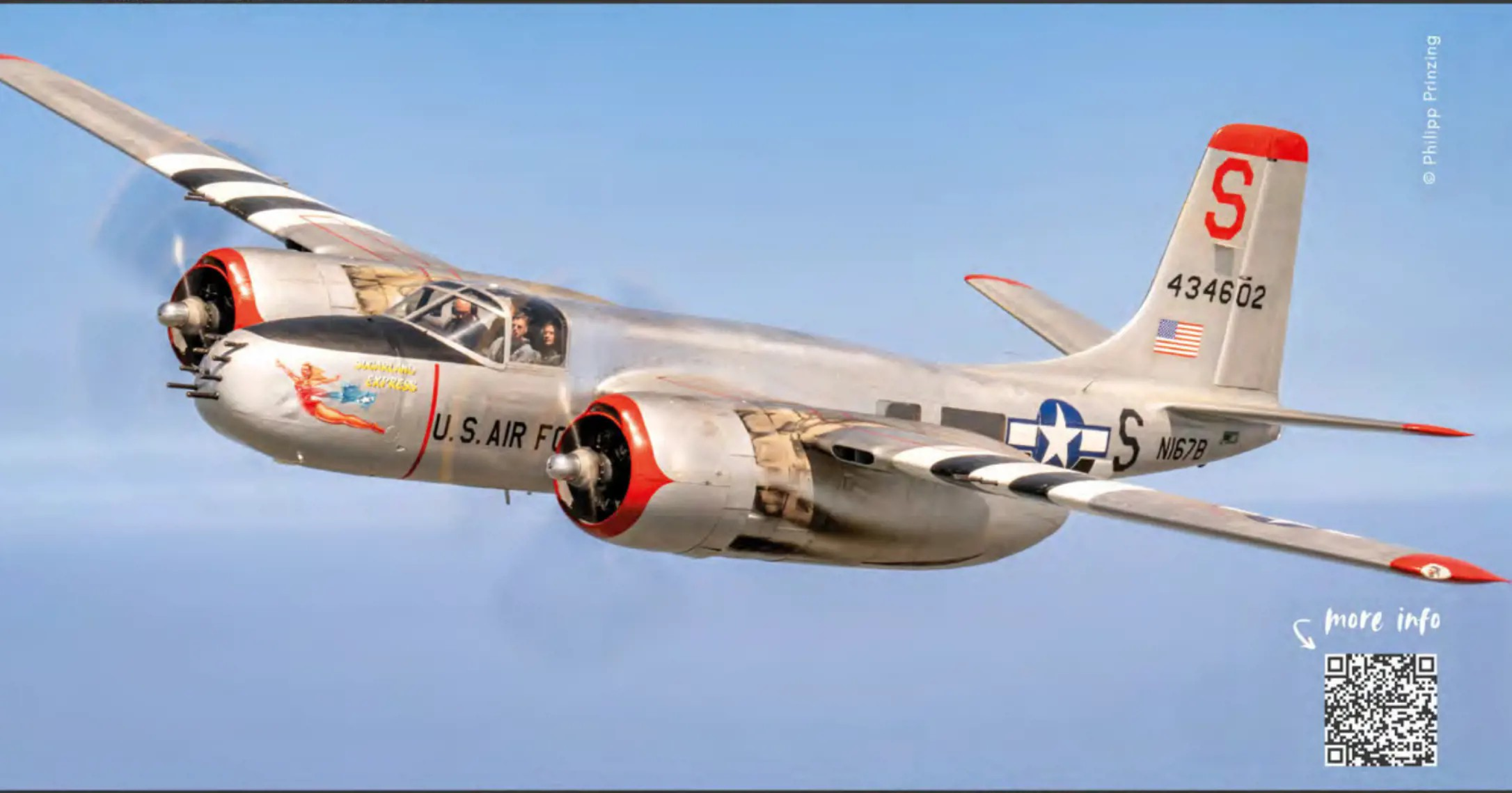


DOUGLAS A-26B INVADER

MONARCH CONVERSION

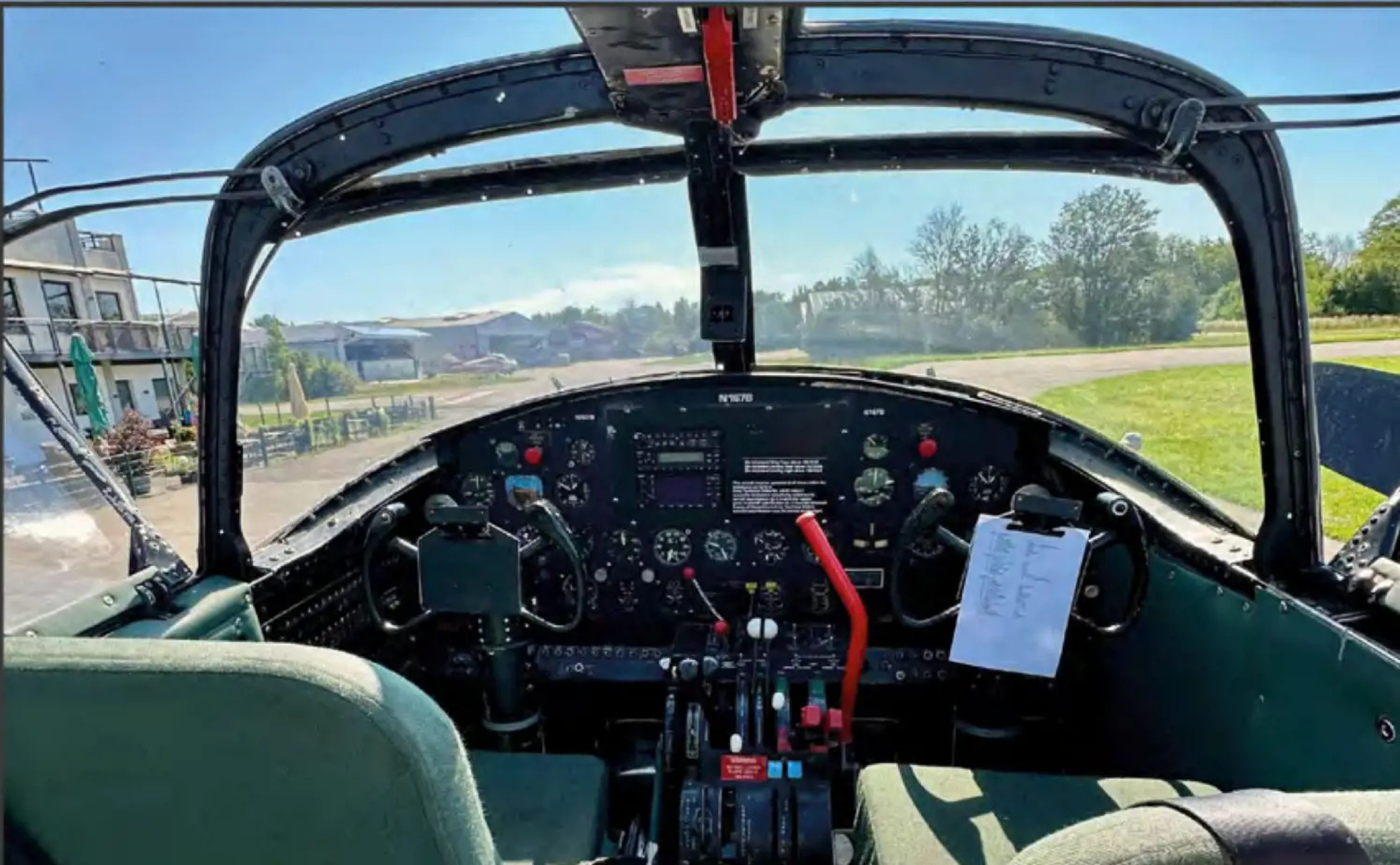
Registration: **N167B**
Manufacturer: **Douglas**
Serial number: **44-34602**
Year: **1944**
Location: **Germany, EDTG**
Engine: **2x Pratt & Whitney R-2800-79**
Propeller: **2x 23E50-505**

This is a "Monarch-26" Conversion with Ring-Spar-Mod and 6x passenger seats in the back. It has full dual control and was one of the 1st Invaders converted as a Trainer in Burbanks, CA.



© Philipp Prinzing

more info



CONTACT US

TINA FLY GMBH
ACHIM MEIER
+49 1755216889
INFO@TINA-FLY.DE

tinaflygmbh
tinafly_gmbh